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NUCLEAR WASTE PROGRAM

HEARINGS

BEFORE THE

COMMITTEE ON
ENERGY AND NATURAL RESOURCES
UNITED STATES SENATE

ONE HUNDREDTH CONGRESS

FIRST SESSION

ON THE

CURRENT STATUS OF THE DEPARTMENT OF ENERGY'S CIVILIAN
NUCLEAR WASTE ACTIVITIES

JANUARY 29, FEBRUARY 4 AND 5, 1987

PART 1

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NUCLEAR WASTE PROGRAM

THURSDAY, JANUARY 29, 1987

U.S. SENATE,
COMMITTEE ON ENERGY AND NATURAL RESOURCES,
Washington, DC.

The committee met, pursuant to notice, at 11:12 a.m., in room SD-366, Dirksen Senate Office Building, Hon. J. Bennett Johnston, chairman, presiding.

OPENING STATEMENT OF HON. J. BENNETT JOHNSTON, A U.S. SENATOR FROM THE STATE OF LOUISIANA

The CHAIRMAN. It is my pleasure to welcome Secretary of Energy John Herrington to the hearing today to testify on the program being carried out under the Nuclear Waste Policy Act of 1982 by the Department of Energy. I intend that this examination be comprehensive. I also intend that when we are done we will have a program that works, so this is just the first of several hearings that we will have on this issue. This basic nuclear waste program is a very important, that is to say vital, program. It is also highly controversial.

It is very expensive, and it is a program that has to succeed. There is no choice but to succeed with this program. The waste is there. It must be disposed of.

I congratulate the Secretary for his appearance today. The Secretary is the one who is responsible for the policy of the Department. He should be the one who answers the questions about those policies.

We also have hearings on the nuclear waste program scheduled for next week, February 4 and 5. On February 4 the States and affected Indian tribes will present their concerns with the program for siting the first repository under the Act. The Department is invited to respond to those concerns on February 5.

We had hoped to have the Secretary here on the 5 to present the Department's response, but his schedule does not permit it. He is here today to present his views and status of the program.

This appearance is also timely because of the release yesterday of the Department's proposed amendments to the mission plan for civilian radioactive waste management.

This plan provides a guide to the Department's intentions in implementing the Act. The amendment to the mission plan announced yesterday restates DOE's intention to postpone site-specific work on a second repository or eastern repository, extends the date contemplated for opening the first repository from 1998 to 2003, and reemphasizes the importance of the monitored retrievable storage, or MRS, facility for acceptance of spent fuel from utilities on schedule in 1998.

There has been some misunderstanding of the meaning of these amendments of the mission plan. The mission plan is required under Section 301 of the Nuclear Waste Policy Act. The plan exists to inform Congress and the public about the Department's intentions in implementing a program. The plan has no legal status.

The Act itself is the legal basis for the nuclear waste program. What the Department says or does not say in the mission plan has no effect on the provisions of the Act, so Congress is under no obligation to respond by some particular time limit to the mission plan or to any amendments to it.

Some of the provisions of the plan state intentions that are contrary to the provisions of the Act. The part of the plan that provides for an indefinite postponement of site-specific work on the second or eastern repository is such a provision. Indefinite postponement of the second or eastern repository is plainly contrary to the Act.

The DOE cannot make that decision "legal" by anything it says in the mission plan, nor does Congress' action or inaction in reviewing the plan have any effect on the legality of these actions. It is the Act that determines what is or is not legal. The Act says what it says until the Act is amended.

If DOE does something contrary to the Act it is taking a risk. There is a risk of challenging the courts, and such challenges have been made. There is a risk of Congressional reaction to what DOE does as well. I expect some of my colleagues will propose legislation reacting to what DOE has done with this program. But none of these risks become reality until the court rules, or until the Congress acts. Until that time, the Act is the only guide to what is legal or illegal about the program.

[The following memorandum was submitted for the record at the request of the Chairman:]

Department of Energy
Washington, DC 20585

September 5, 1986

MEMORANDUM FOR: Benard C. Rusche
Director, Office of Civilian
Radioactive Waste Management

FROM: J. Michael Farrell
General Counsel

SUBJECT: Relationship Between the Mission Plan and Second Repository Recommendation Requirements of the Nuclear Waste Policy Act of 1982

This memorandum memorializes advice previously rendered to your office regarding the legal relationship between the requirements contained in sections 112 and 114 of the Nuclear Waste Policy Act, 42 U.S.C. 10132 and 10134, to make recommendations in 1989 and 1990 of a candidate site for a second repository, and the mission plan required by section 301 of that statute, 42 U.S.C. 10221. Consideration of this question relates to the Department's recent decision that site-specific activities concerning a second repository should be deferred indefinitely because of current estimates of quantities of spent reactor fuel that will be generated during the remainder of this century.

The particular question presented is whether an amendment to the mission plan required by section 301 of the Act would have the effect of supplanting the requirements appearing in section 112 and 114 that recommendations be made regarding a second repository site in 1989 and 1990. For the reasons stated below, the conclusion of this office is that, while an amendment to the mission plan is an entirely appropriate means under the statute to present information concerning the need and timing of a second repository to the Congress, such an amendment, standing alone, would not have the legal effect of altering the provisions of section 112 and 114 that require particular recommendations by particular times regarding a second repository site.

In approaching this question the threshold inquiry is whether an amendment to the mission plan is an appropriate vehicle under the Act to address the question of the need and timing of site-specific activities in the second repository program. The statute specifies that the mission plan shall be a "comprehensive" document that is capable of providing "an informational basis sufficient to permit informed decisions to be made in carrying out the repository program. . . ." 42 U.S.C. 10221(a). The Act specifies explicitly that the mission plan should address scheduling of major elements of the repository program, 42 U.S.C. 10221(a)(2), as well as the need for any additional legislation. 42 U.S.C. 10221(a)(3). Likewise the plan is to contain a description of "known sites at which site characterization activities should be undertaken. . . ." 42 U.S.C. 10221(a)(7). Finally, the plan is required to address total repository capacity required to accommodate spent fuel expected to be generated through the year 2020, as well as "the number and type of repositories" that would be required as well as a schedule for their construction. 42 U.S.C. 10221(a)(9).

From this it seems clear that the number and schedule of repositories, possible future legislation, and estimates of required capacity all are subjects to be embraced within the mission plan. These are the very factors that are implicated by the Department's conclusion that site-specific activities in the second repository program should be deferred indefinitely. While the statute itself, as it was ultimately adopted by the Congress, does not expressly require an amendment to the mission plan to reflect circumstances and progress and understanding of likely future program requirements, formulation of an amendment to the mission plan is entirely in keeping with the Congress' intention of the plan "to serve as a planning blueprint for the programs authorized under the Act." H.R. Rep. No. 411, 97th Cong., 1st Sess. 29 (1981). Thus we believe it is entirely appropriate, as a matter of law, for the Department to have determined that significant matters, including new information, relating to the conduct of the second repository program should be presented to the Congress through an amendment to the mission plan.

Neither the text of the statute nor its legislative history speaks to the relationship between the repository identification and scheduling provisions of the mission plan and other provisions, contained elsewhere in the statute, that bear upon the second repository program. Thus it is necessary briefly to examine those provisions as well.

At the outset we observe that, in contrast to the first repository, the Nuclear Waste Policy Act expressly refrains from authorizing construction of a second repository. It accomplishes this through section 302(d) of the Act, 42 U.S.C. 10222(d), which prohibits expenditures from the Nuclear Waste Fund for any facility construction unless it is "expressly authorized by this or subsequent legislation." That section further authorizes the Department "to construct one repository. . . ." From this provision it is apparent that any recommendation required by the Act regarding the siting of a second repository at most would comprise a recommendation for new legislation from the Congress. Unlike the case of the first repository, whose construction is authorized by the Nuclear Waste Policy Act after conclusion of the complex task of characterization and other decisions required by the statute, no second repository construction activities actually could occur without entirely new express authorizing legislation to be enacted by the Congress in the future.

Notwithstanding this distinction, section 112 of the Act expressly addresses nomination and recommendation of candidate sites for a second repository. Section 112(b)(1)(C) requires the Department, "[n]ot later than July 1, 1989," to nominate five sites and to recommend to the President three candidate sites for characterization "for selection of the second repository." The President is then required to review "each candidate site recommendation," but after the "required recommendation of candidate sites" yet additional sites may be identified and characterized under the same procedures. 42 U.S.C. 10132(c), (d). Likewise does section 114(a)(2)(A) of the Act, 42 U.S.C. 10134(a)(2)(A), require the President, no later than March 31, 1990, to "submit to the Congress a recommendation of a second site from any site already characterized. . . ."

From this it is apparent that the statute, although it does not itself authorize construction of a second repository, does contemplate particular site recommendations to be made regarding the second repository in 1989 and 1990. Nowhere do the provisions imposing the requirement for these recommendations condition or otherwise expressly relate those provisions to the companion ones dealing with the mission plan.

While it is clear that the Congress intended the subjects to be addressed in the mission plan to include the very factors that bear on the timing of site-specific actions in the second repository program, it did not condition the requirements to make recommendations regarding a second repository site on the factors to be addressed in the mission plan. While it is entirely reasonable to infer from the explicit limitation of the construction authorization to one repository that Congress intended to reserve an opportunity for de novo consideration before construction of any second repository, it nonetheless left intact the specific requirements to make recommendations regarding the site of the second repository in 1989 and 1990. As statutory requirements they remain intact until repealed, amended or supplanted by new legislation adopted through constitutionally-required procedures of bicameralism and presentment to the President. Cf. I.N.S. v. Chadha, 462 U.S. 919 (1983). In view of the fact that the mission plan provisions of the Act explicitly contemplate both the subjects of estimates required for repository capacity and appropriate new legislative initiatives, it seems clear that harmonizing the elements of the statute would entail treatment of matters such as the second repository program in the mission plan with a view to consideration of appropriate new additional legislation by the Congress.

As we understand it, this is precisely the course of action that the Department has adopted in addressing the second repository program. It has revised downward its estimates of the waste that will be generated during the remainder of this century and the repository capacity that would be necessary to accept those wastes. It seems apparent from the Act's legislative history that judgments regarding such required capacity had a significant bearing on the statute's treatment of the second repository program. See, e.g., 128 Cong. Rec. S 15653 (daily ed. Dec. 20, 1982) (Remarks of Sen. Gorton); Id. at 15661 (Remarks of Sen. Moynihan).

Thus, for the foregoing reasons, the provisions of sections 112 and 114 of the Nuclear Waste Policy Act that require recommendations concerning a second repository are not themselves supplanted by an amendment to the mission plan required by section 301 of the Act. Despite this, however, the course of action adopted of formally proposing redirection of the second repository program, based on evaluations of new information that bear on the question of timing and need, through amendment of the mission plan appears to be entirely appropriate and consistent with Congress' expectation that the mission plan will deal with subjects, like the second repository, that under any approach will require additional legislation before being authorized for construction.

The CHAIRMAN. Mr. Secretary, there are literally hundreds of questions, vital, controversial, difficult, that must be asked, that will be asked. Some have good and satisfactory answers. Some do not. But this is the first of those difficult hearings. So I think we should get on with the hearings. I have invited Senator Brock Adams, who some months ago requested that I hold special hearings on the Nuclear Waste Policy Act. I have also invited Senator Sasser, who has an interest because of the MRS in Tennessee, to sit with us. and they will be permitted to ask questions later on.

I hesitate to have opening statements at this point because our time is so limited, so if I may just, with the concurrence of the committee, limit opening statements to the ranking minority member, Senator McClure.

STATEMENT OF HON. JAMES A. McCLURE, A U.S. SENATOR FROM THE STATE OF IDAHO

Senator McCLURE. Thank you very much, Mr. Chairman. I understand the need to limit opening statements. I have an opening statement which I ask be made a part of the record.

The CHAIRMAN. Without objection.

Senator McCLURE. I will summarize very briefly to say that the Act that was passed was the result of a lot of effort on the part of a lot of people and required in order to be passed at all a careful and sensitive balance between competing interests and concerns. My concern over the last couple of years has been whether or not that balance is being maintained or whether it is being destroyed.

I think we all knew it is going to be difficult not only to pass a bill but to implement a program. As is obvious from the current events, the launching of a program even before the implementation of it has proved to be extremely volatile politically in various areas of our country, geographicaly and in terms of interest areas.

My concern, I guess, is best expressed by my appreciation to you, Mr. Secretary, for your willingness to adapt your schedule to our requirements in order to be here to express the administration's position on an extraordinarily difficult policy area and to you, Mr. Chairman, for arranging the schedule in such a way that the Secretary could be here at this opening, which I think is absolutely essential and important, and to express my concern and recognize that when you and I cooperated as many others did in passing the Act in the 97th Congress that we set some timetables that we knew were extremely rigid and difficult.

I believe that those timetables were overly optimistic, and we certainly did at that time recognize the difficulty in meeting them, but they were stated the way they were in the law because there was the urgent necessity of developing a program. That urgent necessity remains. I am not sure that I want to get involved too much in a discussion of what is legal or what is not legal under the statute. Certainly a lot of people focus on that question, being critical of the timetable, but I am going to view these hearings from the standpoint that if that timetable established in the statute was inappropriate and if circumstances and the knowledge we have gained since the timetable was established indicate that the timetable needs to be revised, then let us get that issue before this committee, before the Congress and its appropriate organs and say, all right, let us change the time table, but let us make that a cooperative effort in which the Congress is involved in the decision as to what the timetable should be and how that varies from that which was laid out in the statute in the first place.

I do not think it would be fair for us and the Congress to simply point our fingers at the administration and say, hey, you are doing something wrong, do something different, without Congress telling you what we expect you to do. On the other side of that I think it is equally important for the administration to work carefully with the Congress in the development of a timetable which is realistic if indeed the one expressed in the current statute is not. I look forward to your participation in this hearing and I appreciate your willingness to be here, and again I wish to thank the Chairman for having accommodated this opening schedule to your own requirements this morning.

[The prepared statement of Senator McClure follows:]

OPENING STATEMENT OF
SENATOR JAMES A. McCLURE

GOOD MORNING. LET ME BEGIN BY TAKING A MOMENT TO EXPRESS MY APPRECIATION TO SECRETARY HERRINGTON FOR TAKING THE TIME TO PERSONALLY APPEAR BEFORE THE COMMITTEE ON THIS IMPORTANT ISSUE. I WOULD ALSO COMMEND THE CHAIRMAN FOR THE EFFORTS HE MADE TO ACCOMMODATE THE SECRETARY'S SCHEDULE.

AS MANY PEOPLE IN THIS ROOM MAY RECALL, PASSAGE OF THE NUCLEAR WASTE POLICY ACT OF 1982 WAS NO SIMPLE TASK. MANY CONGRESSES GRAPPLED WITH THE ISSUES, BUT THE PROPER RESOLUTION ELUDED US FOR YEARS. YET IN THE 97TH CONGRESS, THROUGH PERSEVERANCE, WE WERE ABLE TO FOCUS ENOUGH EFFORT, GARNER ENOUGH SUPPORT, PROVIDE THE PROPER BALANCE, AND MAINTAIN SUFFICIENT MOMENTUM TO ACTUALLY GET A BILL PASSED IN THE WANING DAYS OF THAT LAME DUCK SESSION.

BUT OF ALL THE ELEMENTS THAT CONTRIBUTED TO THE BILL'S FINAL PASSAGE, I WOULD SAY THAT THE PROPER BALANCE WAS KEY TO EVERYTHING. ALL OF US HERE TODAY REALIZE HOW NECESSARY THE "ART OF COMPROMISE" IS TO ANY PIECE OF LEGISLATION, AND THE NUCLEAR WASTE POLICY ACT WAS NO EXCEPTION.

NONE OF THE AUTHORS OF THE ORIGINAL ACT WOULD BE FOOL ENOUGH TO THINK THAT THE ACT WAS PERFECT. FOR ONE, WE IMPOSED VERY TIGHT--PERHAPS "OVERLY OPTOMISTIC"--DEADLINES IN THE ACT. WE DID THIS TO KEEP THE "PRESSURE ON" FOR A SOLUTION TO A REAL AND URGENT PROBLEM. HOWEVER, WHEN WE NOW HEAR OF SCHEDULE SLIPPAGES, WE ARE NOT TOO TERRIBLY SUPRISED, ESPECIALLY WHEN WE REALIZE THAT THESE SLIPPAGES MAY BE NECESSARY IN ORDER FOR DOE TO DO A CREDIBLE TECHNICAL JOB.

YET, THERE ARE OTHER EVENTS, BESIDES SCHEDULE SLIPPAGES, THAT DO CONCERN THE AUTHORS VERY MUCH. SOME OF THESE EVENTS THREATEN THE VERY FABRIC OF THE PROGRAM.

SOME OF THESE EVENTS RELATE TO THE NATURE AND MULTITUDE OF LAWSUITS PENDING AGAINST DOE. THESE SUITS SEEM TO PROPOGATE AT EVERY STEP OF THE WAY, AND MAY BE UNAVOIDABLE--THE "NATURE OF THE BEAST", SHALL WE SAY.

SOME EVENTS RELATE TO THE LACK OF PROGRESS TOWARDS "GOOD FAITH" NEGOTIATIONS LEADING TO THE FINALIZATION OF "CONSULTATION AND COOPERATION" AGREEMENTS BETWEEN DOE AND THE STATES AND AFFECTED INDIAN TRIBES. I'M NOT EVEN ENTIRELY SURE WHO'S AT FAULT IN THIS AREA.

BUT, WORST OF ALL, EVENTS THAT DO ACTUALLY UPSET THE BALANCE IN THE ACT--OR EVEN HAVE THE APPEARANCE OF UPSETTING THIS BALANCE--GIVE ME GREAT CAUSE FOR CONCERN. SO THIS IS WHY I LOOK AT SOME OF LAST YEAR'S DECISIONS ON THE PART OF THE DEPARTMENT, AND NOW AT DOE'S PROPOSED CHANGES TO THE MISSION PLAN, WITH SOME TREPIDATION. I AM HOPING THAT, AS A RESULT OF TODAY'S HEARING AND THE HEARINGS SCHEDULED FOR NEXT WEEK, WE WILL GAIN A BETTER PERSPECTIVE ON THE PRESENT SITUATION, AND COME TO SOME CONCLUSIONS ON WHETHER OR NOT THE PROGRAM IS STILL ON TRACK. I HOPE OUR ANSWER IS "YES". IF THE ANSWER IS NO, THEN I FOR ONE AM PREPARED TO WORK WITH THE SECRETARY, SENATOR JOHNSTON AND OTHER MEMBERS OF THIS COMMITTEE AND CONGRESS TO GET THE PROGRAM BACK ON TRACK. I DON'T EXPECT THE TASK TO BE EASY. IT HASN'T BEEN IN THE PAST. HOWEVER, NUCLEAR WASTE DISPOSAL IS A PROBLEM WHICH MUST BE SOLVED. I REMAIN COMMITTED TO THAT END.

The CHAIRMAN. May I ask, Mr. Secretary, what is your time constraint today?

Secretary HERRINGTON. We have a Cabinet meeting, Mr. Chairman, at 2 o'clock to debate the SSC and I need to personally be present and make that argument. It is an important project. I am prepared to stay until that time, and I am also prepared to come back if the committee so desires.

The CHAIRMAN. My guess is that your presence would be required later. I do not want to cut any member off if they really want to make an opening statement, but I think it would be better. Does anybody really want to make an opening statement? [General laughter.]

Senator EVANS. No, you just stipulated, Mr. Chairman, that all the opening statements we have worked on so carefully will be submitted for the record.

The CHAIRMAN. Of course.

Senator HECHT. Likewise, Mr. Chairman.

[The prepared statements of Senators Bingaman, Hecht, and Evans follow:]

STATEMENT BY SENATOR JEFF BINGAMAN
HEARINGS ON DOE NUCLEAR WASTE PROGRAM
January 29, 1987

I thank the Chairman for holding this first of a series of three hearings to look at the Nuclear Waste Program of the Department of Energy. Today we discuss the status of a program designed for the disposal of spent nuclear fuel and high-level radioactive waste by the Federal Government in underground repositories and for the long-term storage of such spent fuel and waste in a monitored storage facility.

Very few energy issues in the past few years have attracted as much public attention as the disposal of high-level radioactive waste. With the May announcement by the Secretary of three proposed repository sites, there has been a tremendous level of interest in the Department's plans -- especially from the affected site states.

Today we hear of further plans for the program. I am concerned by the delays indicated in the mission plan submitted by the Agency and the indefinite postponement of site-specific work for the second repository. These delays only frustrate efforts to move our Waste Program forward.

I hope the Congress is able to take effective action this year to resolve the problems causing these delays.

Statement of Senator Hecht

Mr. Chairman, I would like to thank you for holding this hearing today on the recent developments in the nation's high level nuclear waste disposal program.

As I'm sure everyone knows by now, this issue is extremely important to Nevadans, and I am keenly interested in how the Energy Department intends to approach the issue.

I am glad to see that the Energy Department has decided to slow down its schedule for the repository program. The five year delay at the end of the process, and the approximately two year delay that is contemplated for the next step in the process, should allow some breathing room for the Congress and the Department to seriously re-examine the direction we are headed in, and evaluate possible alternatives and ways to improve the program.

Last June this Committee held a hearing on this issue. At that time I told the Secretary that I expected him to reassure me and the people of Nevada that the Department is still committed to a second repository. I have received this reassurance, although I still am convinced that the Department's plan to delay that repository is illegal and should not be permitted by the Congress.

Statement of Senator Hecht

If the Department persists in its intention to violate the law, then I feel we in the Congress will have little choice but to take strong and decisive action, which may mean totally rethinking our approach to high level nuclear waste disposal in this nation.

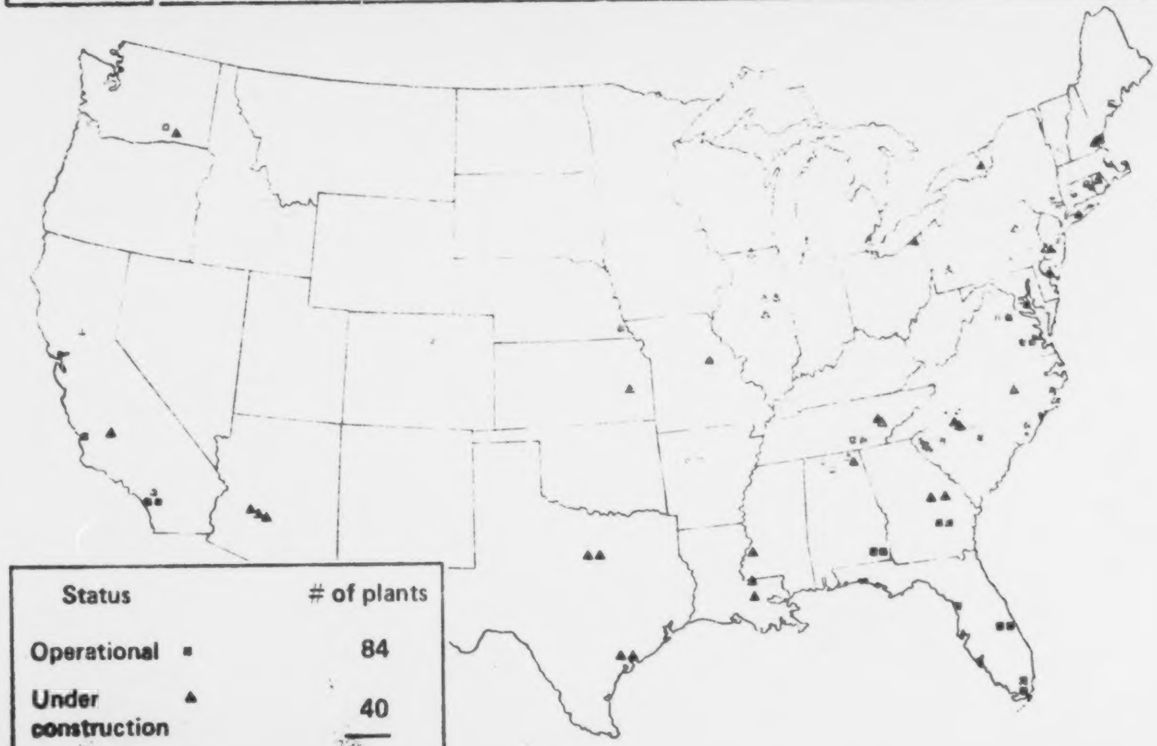
Another major concern I had last June was that the Department should cooperate more fully with the state of Nevada with regard to the state's funding requests for participation in the program. The Department has largely complied with the state's requests in terms of funds, although not a week passes without my receiving correspondence from the state government pointing out yet another problem Nevada is having with the implementation of DOE's nuclear waste program. This continual stream of complaints makes me seriously wonder about the future of this program in general.

I remain willing, although my patience is beginning to wear thin, to work with the Department and the Committee to see if this program can still be fixed.

Mr. Chairman, thank you again for focusing the Committee's attention on this matter, and let me assure you that I am very eager to work with you on this issue in the months ahead.

Nuclear plants

Even without new nuclear plants, nuclear energy use will continue growing for many years



Status		# of plants
Operational	■	84
Under construction	▲	40
Total as of 1984		124

STATEMENT BY SENATOR DANIEL J. EVANS ON HEARING ON DOE'S NUCLEAR WASTE ACTIVITIES

SENATE ENERGY AND NATURAL RESOURCES COMMITTEE
JANUARY 29, 1987

MR. CHAIRMAN, I COMMEND YOU FOR HOLDING THESE IMPORTANT HEARINGS EARLY ON IN THIS SESSION OF CONGRESS. MANY EVENTS HAVE TRANSPIRED SINCE THE INCLUSION OF THE CUT IN FUNDING FOR NUCLEAR WASTE ACTIVITIES ON THE 1987 CONTINUING RESOLUTION THAT MAKE THIS COMMITTEE'S COMPREHENSIVE REVIEW OF DOE'S PROGRAM MORE IMPERATIVE AND TIMELY THAN EVER BEFORE. THEREFORE I APPRECIATE THE WILLINGNESS OF THE CHAIRMAN TO ACCOMMODATE THE INTERESTS OF SENATOR HECHT, MYSELF, AND OTHER SENATORS FROM CANDIDATE STATES TO MOVE PROMPTLY TO THESE HEARINGS.

THE NUCLEAR WASTE PROGRAM NEEDS A SUBSTANTIAL MID-COURSE CORRECTION. DOE'S DECISION ON MAY 28TH HAS CAUSED GREAT CONCERN AND OUTRAGE AMONG MANY STATES AND AFFECTED PARTIES. SUBSEQUENT ACTIONS HAVE INTENSIFIED THAT CONCERN. I'VE COMPARED THE MANAGEMENT OF THE WASTE PROGRAM TO THAT OF A LOCOMOTIVE BARGING DOWN THE TRACK WITH LITTLE OR NO CONCERN FOR OTHERS ON OR AROUND THE TRACK. IT MAKES THE PRETENSE OF HEEDING THE DIRECTIVES OF THE AUTHORIZING AND APPROPRIATIONS COMMITTEES -- BUT THEN CHARGES AHEAD ON ITS OWN COURSE.

FURTHERMORE, AS WE SEE WITH THE MISSION PLAN AMENDMENT, THE DEPARTMENT IS BOLDLY PROCEEDING TO MODIFY THE STATUTES AND INTENT OF THE 1982 NUCLEAR WASTE POLICY ACT THAT CONGRESS PASSED AFTER MUCH DELIBERATION. THEN THE DEPARTMENT HAS THE GALL TO IMPLY: "WE'LL GO AHEAD AND IMPLEMENT THESE CHANGES IF THE CONGRESS DOESN'T ACT AFFIRMATIVELY IN 30 DAYS TO OVERRULE OUR NEW GAME PLAN". MR. CHAIRMAN, THIS ISN'T THE "CAREFUL IMPLEMENTATION OF THE ACT" AND THE "DEVELOPMENT OF A CONSENSUS AMONG THE AFFECTED PARTIES, ESPECIALLY THE STATES" THAT THE CONTINUING RESOLUTION (CR) SPECIFICALLY DIRECTED DOE TO CARRY OUT DURING THIS FISCAL YEAR.

THIS IS SIMPLE ARROGANCE AND BULLHEADEDNESS. I THINK IT'S HIGH TIME TO BRING THE DEPARTMENT BACK TO REALITY. LET'S REMEMBER WHAT THE MISSION PLAN REALLY IS: IT'S A GAME PLAN THE DEPARTMENT DRAFTS TO CARRY OUT THE DIRECTIVES AND STATUTES IN THE LAW PASSED BY CONGRESS. IT IS NOT THE LAW -- IT IS A BASE OF INFORMATION AND PROJECT DEADLINES THAT DOE, IN ITS JUDGMENT, BELIEVES ARE NECESSARY AND USEFUL TO CARRY OUT THE LAW.

I THINK WHAT WE SEE IN THE DOE PROGRAM TODAY IS THE LOCOMOTIVE SWITCHING TRACKS RATHER SUDDENLY AND ABRUPTLY TOWARD DIFFERENT DESTINATIONS IN DIFFERENT STATES. THE NEAR-TERM GOALS

CHANGE, SUCH AS GETTING THE MRS FACILITY READY BY 1998 OR PUTTING YUCCA MOUNTAIN SLIGHTLY AHEAD OF HANFORD IN SITE CHARACTERIZATION. BUT THE PROCESS FOR REACHING THOSE DECISIONS REMAINS SERIOUSLY FLAWED. THE CREDIBILITY OF THE PROGRAM IS AT AN ALL-TIME LOW, BOTH HERE ON THE HILL AND AROUND THE COUNTRY. THE DOE DECISION-MAKING PROCESS CERTAINLY DOESN'T INSPIRE CONFIDENCE. AND I WOULD SUSPECT THAT THE ELECTRIC UTILITIES AND EVEN THE SECOND-ROUND STATES ARE COMING TO RECOGNIZE THAT THEIR INTERESTS ARE NOT NECESSARILY BEING SERVED BY THE PRESENT MANAGEMENT OF THE PROGRAM. IN FACT, THE MISSION PLAN AMENDMENT WILL PROBABLY INSPIRE SOME PARTIES TO CHALLENGE THE WASTE CONFIDENCE DETERMINATION MADE BY THE NRC SEVERAL YEARS AGO.

I FEEL STRONGLY THIS COMMITTEE NEEDS TO EXAMINE CAREFULLY THE FULL RANGE OF ALTERNATIVES TO DOE'S CONTINUING EMPHASIS ON LONG-TERM DISPOSAL IN A PERMANENT GEOLOGIC REPOSITORY. WE MAY HAVE OUR PRIORITIES BACKWARD IN DEVELOPING A GEOLOGIC REPOSITORY PRIOR TO AN INTERIM STORAGE FACILITY. THIS COMMITTEE HAS RECENTLY RECEIVED USEFUL TESTIMONY FROM SWEDISH REPRESENTATIVES ON THE STRATEGY AND OPERATION OF ITS PROGRAM. THIS QUESTION BECOMES PARTICULARLY IMPORTANT IF THE CONGRESS RE-EXAMINES: THE ESTIMATES OF WASTE GENERATION OF A LOWER THAN PROJECTED NUMBER OF NUCLEAR POWERPLANTS; AND THE MUCH HIGHER COST OF CHARACTERIZING AND CONSTRUCTING DEEP GEOLOGIC REPOSITORIES TODAY.

MR. CHAIRMAN, ALL THESE QUESTIONS SHOULD BE PUT ON THE TABLE. THE DISPOSAL AND VOLUME OF DEFENSE HIGH-LEVEL WASTE MUST NOT BE FORGOTTEN IN THIS DEBATE. THE ADMINISTRATION STILL HASN'T REACHED AGREEMENT ABOUT WHEN AND HOW MUCH THE PENTAGON PAYS INTO THE NUCLEAR WASTE FUND FOR COMMINGLING DEFENSE WITH COMMERCIAL WASTES. FINALLY, I DON'T THINK WE SHOULD EXCLUDE THE QUESTION OF REPROCESSING COMMERCIAL HIGH-LEVEL WASTES FROM THIS DISCUSSION. CIRCUMSTANCES HAVE CHANGED SUFFICIENTLY, IN MY VIEW, FROM DECISIONS MADE IN THE 1970'S ON REPROCESSING THAT WARRANT RENEWED ATTENTION ON THIS SUBJECT.

WHERE ALL THIS IS GOING TO LEAD, MR. CHAIRMAN, I FRANKLY DON'T KNOW RIGHT NOW. ONE THING IS CLEAR: THE CREDIBILITY OF THE NUCLEAR WASTE PROGRAM HAS BEEN SERIOUSLY ERODED. YET WE IN THE CONGRESS NEED TO FACE UP TO THE PROGRAM OF LONG-TERM DISPOSAL OF THESE WASTES. UNFORTUNATELY, DOE HASN'T YET BEEN ABLE TO ADDRESS SQUARELY THESE DIFFICULT ISSUES IN A WAY THAT INSPIRES PUBLIC CREDIBILITY. I AM PLEASED TO SEE THAT THE CHAIRMAN HAS ACCORDED THIS ISSUE A HIGH PRIORITY ON HIS AGENDA IN 1987 AND LOOK FORWARD TO WORKING WITH HIM IN THE NEXT SEVERAL MONTHS.

Principal Shortcoming

New write-up blantantly manipulates the methodology and its application to force it to spit out the "proper" sites. It throws out certain factors, arbitrarily reduces or increases the value of others, picks certain trade offs as better than others and portrays the methodology as decision-maker.

Initial write-up tells it like it is. It describes the methodology as decision-aiding, evaluates both results and insights from the application of the methodology, and describes the rationale for the site selection. It recognizes the importance of guideline requirements and other considerations a policy-maker must legitimately consider in reaching a final decision.

Serious Shortcomings

- Provides no technical justification for the decision
- Arbitarily throws out cost as a consideration in violation of Act and Guidelines
- Winds up saying socioeconomics is the basis for the decision
- States that post-closure should not be weighed too heavily in direct violation of Act, Guidelines, NAS recommendation and common sense
- Arbitarily decides a post-closure weighting between .50 and .57 is correct. Reduces Richton v. Hanford to this one factor
- Incorrectly implies little difference in health and safety impacts among sites
- Portrays the methodology as decision-maker - a very dangerous approach
- Portrays rock diversity as requiring 3 types. If that were the case, no need for this methodology - simply pick one salt site

Leaves Out

- Understanding of proper role of the methodology as decision-aiding and its place in overall departmental process of selection
- Understanding of implications of making a portfolio decision
- Proper understanding of role of geologic consideration
- Description of value and content of the methodology
- Consideration of accessible environment differences, strongly recommended by NAS
- A most important conclusion that all sites are expecte to perform exceedingly well in post-closure, allowing flexibility to pick sites that score "lower" for other reasons
- Any discussion of insights gained from sensitivity analyses
- The array of results the methology produces from look at the various combinations of factors that provide justification for our decision
- Discussion that this is a preliminary decision of whic sites to characterize-so cost commitments are not for program, only for characterization
- Discussion of value of and need for considerations of rock diversity

The **Chairman**. I appreciate the forebearance of the committee. Mr. Secretary.

STATEMENT OF HON. JOHN S. HERRINGTON, SECRETARY OF ENERGY; ACCOMPANIED BY BEN C. RUSCHE, DIRECTOR, OFFICE OF CIVILIAN RADIOACTIVE WASTE MANAGEMENT

Secretary **Herrington**. Thank you, Mr. Chairman. May I add my thanks to you and to this Committee for allowing me to appear this morning at a modified schedule, and I deeply appreciate it. We will be back on the 5th with Mr. Rusche, and then we will be happy to make further appearances. I, too, would like to submit a detailed statement for the record, but I would like to make a few remarks if I could before we start questioning.

We have prepared a draft amendment to the Mission Plan for the civilian radioactive waste management program. That draft program is here with me today: the draft Mission Plan amendment. In that document, which we are sending to the States and the affected Indian tribes, the Nuclear Regulatory Commisson, and other Federal regulatory agencies for comment, and which we will make available for public inspection, we discuss significant developments and new information in the waste program. The Mission Plan is intended to keep Congress fully informed on progress in the program and the amendment will ensure the plan reflects current program status.

After a 60-day comment period, DOE will revise the amendment in response to the comments as appropriate and will submit it formally to Congress for information and direction. We would expect this to occur in about 120 days from now. Of course, these are rough time limits. With your permission, Mr. Chairman, I would like at this time to submit a copy of this draft amendment for the record.

The **Chairman**. Without objection.

[The Draft Mission Plan Amendment dated January 1987 follows:]

DOE/RW-0128

Draft Mission Plan Amendment

January 1987

U.S. Department of Energy
Office of Civilian Radioactive Waste Management
Washington, DC 20585

FOREWORD

This draft amendment to the Mission Plan is being submitted to States and affected Indian Tribes and Federal agencies for their review prior to formal transmittal to Congress as provided for in Section 301 of the Nuclear Waste Policy Act (NWPA). Following interaction with these parties, and the submission of their formal comments, the Mission Plan Amendment will be submitted to Congress.

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AMENDMENT
TO THE MISSION PLAN
FOR THE CIVILIAN RADIOACTIVE WASTE MANAGEMENT PROGRAM

As required by the Nuclear Waste Policy Act of 1982 (the Act), the U.S. Department of Energy (DOE) published in June 1985 the Mission Plan for the Civilian Radioactive Waste Management Program.[1] The purpose of that document was to "provide an informational basis sufficient to permit informed decisions to be made in carrying out the programs required under the Act." In preparing the Mission Plan, the DOE recognized that this informational base would change over time, requiring the Mission Plan to be revised. The first such revision is this amendment, which has been prepared to apprise the Congress of—

- Significant recent achievements in the waste-management program.
- The revised schedule for the first repository.
- The decision to postpone site-specific work for the second repository and plans for continuing the technology-development program for the second repository.
- The DOE's intention to submit to the Congress, as soon as practicable, a proposal for the construction of a facility for monitored retrievable storage (MRS) as an integral part of the waste-management system.

Also discussed are efforts to better define the consultation-and-cooperation interactions between the DOE and affected States and Indian Tribes.

Included in this amendment are six appendixes. The first four present more-detailed information about achievements in the first-repository program (Appendix A), the revised schedule for the development of the first repository (Appendix B), the MRS facility (Appendix C), and the program for the second repository (Appendix D). The last two appendixes discuss trends in forecasts of spent-fuel discharges (Appendix E) and an illustrative schedule for waste acceptance (Appendix F) that accounts for the MRS facility, the revised schedule for the first repository, and the delayed introduction of the second repository.

SIGNIFICANT RECENT ACHIEVEMENTS IN THE WASTE-MANAGEMENT PROGRAM

Summarized below are significant recent achievements in the program for the first repository, the development of the waste-transportation system, and the demonstration of technologies for temporary storage. More-detailed discussions of progress in the waste-management program can be found in the Annual Report to Congress[2] and the budget submittal. The achievements summarized here are those that have affected the decisions and plans described in this Mission Plan amendment.

Achievements in the first-repository program

Significant recent achievements in the program for the first repository include the selection of sites for characterization and advances in technical planning.

Selection of sites for characterization. On May 27, 1986, the Secretary of Energy, as required by the Nuclear Waste Policy Act, nominated five sites in Mississippi, Nevada, Texas, Utah, and Washington as suitable for characterization and recommended to the President that three of these sites--the Yucca Mountain site in Nevada, the Deaf Smith County site in Texas, and the Hanford site in Washington--be characterized as candidate sites for the first repository.* The Secretary's recommendation was approved by the President on May 28, 1986. The Secretary also made the preliminary determination that the recommended sites are suitable for development as repositories.[3]

These events represent major milestones in the first-repository program. Each of the five nominations was accompanied by an environmental assessment[4-8] containing information and analyses condensed from hundreds of supporting documents. These documents represent years of work in gathering and analyzing geologic and environmental data from site studies that began before the enactment of the Act.

To aid in identifying preferred sites for characterization, the DOE developed and applied a formal siting methodology[9] that analyzed the potential performance of each site during the preclosure period (i.e., during the period the repository is receiving and emplacing waste) and for thousands of years after the permanent closure of the repository. As described in Appendix A, this decision-aiding methodology was an elaboration, developed in response to comments, of one of the methodologies described in the draft environmental assessments.[10-18] The revised methodology and the proposed approach to its application were reviewed** and found appropriate by the National Academy of Sciences.[19]

The analysis used in the methodology predicted that all of the sites recommended and approved for characterization were likely to perform exceedingly well; in particular, it showed that, after closure, all the sites would greatly exceed the 10,000-year waste-isolation requirements established by the U.S. Environmental Protection Agency (EPA).[20] Given the analyses in the environmental assessments, the information base, and the results and insights obtained with the decision-aiding methodology, the DOE believes that the candidate sites will be demonstrated to be suitable for a repository, recognizing that the demonstration of suitability must await the results of site characterization and complete performance assessments against regulatory requirements.

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*A brief description of the siting process specified by the Act as well as the milestones achieved to date is given in Appendix A.

**The Academy chose not to review the site-recommendation decision or to comment on the three sites that were recommended and approved.

Advances in technical planning. To obtain a construction authorization from the Nuclear Regulatory Commission (NRC), it will be necessary to select a site, to develop site-specific designs for the repository and the waste package, and to demonstrate that the repository system--that is, the site, the repository, and the waste package--meets the requirements of the EPA standards[20] and the NRC criteria[21] promulgated in 40 CFR Part 191 and 10 CFR Part 60, respectively. These activities will require the collection of extensive earth-science data during site characterization.

Site characterization includes laboratory investigations; surface-based data-collection activities like geologic mapping and seismic surveys; studies conducted through the drilling of boreholes; and, most important, studies conducted in the proposed host rock in an "exploratory-shaft facility." This facility will consist of two exploratory shafts sunk to the depth of the proposed repository, a drift connecting these shafts, and other underground tunnels extending for several thousands of feet. Site characterization began in May 1986, after the President's approval of the recommended sites, and will continue for 6 to 7 years, depending on the site. Concurrently with characterization, the DOE will conduct studies of environmental and socioeconomic conditions in the areas of the candidate sites. Plans for such studies are currently in review.

The Act requires that, before sinking the shafts, the DOE prepare a site-characterization plan for each site. These plans are to be submitted for review and comment to the Nuclear Regulatory Commission, the Governors and legislatures of the States containing the candidate sites, affected Indian Tribes, and the public. To guide the preparation of these plans and to ensure that all the data required for site selection and licensing will be available when needed, the DOE has developed two organizing principles: an "issues hierarchy"[22] and an "issue-resolution strategy"; both are described in more detail in Appendix A. The issues hierarchy states the questions that must be resolved in a logical order to demonstrate that the repository system meets regulatory requirements. It thus provides a framework for developing the site-characterization program and for explaining why the characterization program is adequate and necessary. Similarly, the issue-resolution strategy guides the development of specific plans for resolving each issue and provides the rationale for the associated site-characterization activities. The scope and the magnitude of this effort can be gauged from the site-characterization plans now being prepared for publication: in each plan, the description of the characterization program alone covers several thousand pages.

The issue-resolution strategy is common to all three candidate sites and includes the performance allocation specifically requested by the staff of the Nuclear Regulatory Commission.[23] Briefly stated, performance allocation requires the DOE to identify, for each issue, the elements of the repository system that will be relied on to resolve the issue; it also requires quantitative statements describing the expected behavior of those elements and the information that the site-characterization tests and analyses are expected to provide. Thus the strategy will facilitate the preparation and review of the environmental impact statement, the selection of the site for the first repository, the preparation of the license application, and the NRC's review of the application.

Progress in transportation and storage technologies

Transportation. Significant progress can also be reported for the transportation program. The DOE has issued both the Transportation Business Plan,[24] which presents strategies for procuring shipping casks and support services for transportation, and the Transportation Institutional Plan,[25] which lays the foundation for interactions among interested parties for cooperation and the resolution of transportation issues. The third major accomplishment was the release in July 1986 of the request for proposals for the development of casks for shipping spent fuel from reactors to the DOE's waste-management facilities. As required by the Act, this request asked private industry to compete for contracts for design and engineering, certification and testing, and the fabrication of prototype casks.*

Storage technologies. Recognizing that some utilities may exceed their spent-fuel storage capacity before they are able to add new onsite capacity or before the DOE can accept the fuel for disposal, the Act provides for research and demonstration on storage. To meet the requirements of the Act, the DOE has established a storage program whose objectives are to encourage and expedite the efficient use of existing storage facilities and the addition of new capacity. Among the means for achieving these objectives were participation in cooperative demonstration programs with utilities to develop dry-storage technologies that can be licensed generically by the Nuclear Regulatory Commission, establishing cost-shared research-and-development programs at Federal facilities, and participation in cooperative programs with utilities to develop the technology for consolidating spent fuel in a reactor storage pool.

Considerable progress toward achieving these objectives can be reported. For example, dry-storage demonstrations and research at the DOE's Idaho National Engineering Laboratory and the Pacific Northwest Laboratory contributed to the Commission's granting two utilities licenses to construct and operate Independent Spent Fuel Storage Installations at the sites of two nuclear power plants. The operation of these facilities will demonstrate the technical and economic feasibility of adding storage capacity in metal or concrete modules at reactor sites. Two demonstrations of rod consolidation in a spent-fuel storage pool have also been conducted. They will contribute to establishing consolidation as another method for achieving the maximum use of existing storage capacity.

EXTENSION OF THE SCHEDULE FOR THE FIRST REPOSITORY

Beginning with the comments on the proposed DOE siting guidelines,[26] which were issued on February 7, 1983, shortly after the Act was signed by the President, and continuing through the comments on the 1984 draft Mission Plan[27] and the Project Decision Schedule,[28] many parties have insisted that, given the controversial nature of the program, the schedule specified by the Act was not realistic and not achievable.* They pointed out that the schedule was not reconcilable with the siting process mandated by the Act--to achieve one it was necessary to sacrifice the other--and suggested that the DOE ask the Congress for schedule relief.

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*It is expected that a contract or contracts will be awarded in the second quarter of calendar year 1987.

The DOE attempted to meet both objectives and developed an aggressive schedule that would allow the first repository to start accepting waste in January 1998. This schedule, first reported in the 1984 draft of the Mission Plan[27] and later revised in the 1985 Mission Plan,[1] resulted from a care- ful evaluation of the feasible options for each phase of the program and was based on innovative approaches to the development of the repository, such as the integration into the construction of the repository of the exploratory shafts used for site characterization and the construction of the repository in two phases. At the same time, the DOE insisted that the schedule would not be allowed to prevail over the equally important need for technical excellence and public participation.

As already mentioned, several important milestones have been achieved. However, the experience gained in achieving those milestones and advances in the technical planning of the program, coupled with a decrease in the budget for fiscal year 1987,** have led the DOE to reassess and rebaseline the program for the first repository and to revise its schedule (see Table 1). The new schedule shows a 5-year extension of the date for waste acceptance at the first repository, from 1998 to 2003. (As explained later, the DOE could nonetheless start accepting waste in 1998 at an MRS facility.)

The schedule remains aggressive and success oriented. As explained more fully in Appendix B, most of the extension occurs in the near term, during the site-characterization and site-selection phases. The activities scheduled for these phases include the preparation and public review of the site characterization plans, the construction of the exploratory shafts, the underground testing program, the preparation of the environmental impact statement, and the preparation of the license application. The remainder provides more time for the NRC review of the license application (36 months instead of the 27 months in the 1985 Mission Plan) and for the construction of the repository (7 months more than in the 1985 Mission Plan).

There are several reasons for the near-term extension. Among them are the delay incurred through the consultation process leading to the nomination and recommendation of sites for characterization; the recognition from this experience that more time should be provided in the future for consultation and interaction with the States, affected Indian Tribes, and other parties; the specification in the budget appropriation for fiscal year 1987 that no funds are to be used for drilling exploratory shafts at any site in fiscal year 1987; and the recognition, resulting from the above-mentioned advances in technical planning, that the site-selection decision and the preparation of the license application will require more information than previously planned. The DOE also recognizes that more time than originally expected may be needed to gain access to, and control of, the land needed for site characterization where the land is privately owned (the Deaf Smith County site in Texas) or under the control of other Federal agencies (the Yucca Mountain site in Nevada). Furthermore, the DOE recognizes the potential for contingencies that are yet to appear.

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*Summaries of these comments and the DOE's responses can be found in Volume III of the 1985 Mission Plan.[1]

**In the budget appropriation for fiscal year 1987, the Congress provided $499 million of the $710 million requested by the DOE.

Consultation

The DOE has adopted the principle that its schedule for the first repository would not be pursued at the expense of consultation and interaction with States and affected Indian Tribes as well as the public. This principle was applied in developing the siting guidelines[29] and in publishing the environmental assessments (EAs) for the first-repository sites.[4-8] Although not required by the Act, the DOE elected to issue draft EAs[10-18] for public comment and to conduct an extensive program of public outreach and interaction, with 19 public hearings held in 7 States. Consultation with the States was pursued by submitting early drafts for review and holding more than 50 briefings for various State officials. In addition, in response to suggestions by the Congress and the public, the decision-aiding methodology was developed, implemented, and submitted to the National Academy of Sciences for review. Together with the need to consider and address more than 20,000 written comments in preparing the final EAs, these activities lasted 17 months (5 months longer than planned in the schedule presented in the 1985 Mission Plan).

The revised schedule allows more time for interactions with the States and affected Indian Tribes on the plans for site characterization, though, of course, increasing technical activities and NRC review will be occurring simultaneously with these interactions. It also allows 6 months more to receive and address comments on the draft environmental impact statement.

Delay in the construction of the exploratory shafts

In the 1985 Mission Plan, the DOE had planned to start sinking exploratory shafts at the candidate sites in Nevada and Washington before the end of fiscal year 1987 and had scheduled for December 1986 the publication of the site-characterization plans for these sites. In response to the budget-related delay and other factors, the DOE decided to use the additional time to implement more thoroughly the issues hierarchy and the issue-resolution process described earlier (see also Sections A.2 and A.3 in Appendix A) and to revise some work sequences. This required revisions in the site characterization plans then in preparation.

The need for more technical information

The recognition that more technical information is needed for the environmental impact statement and the license application has led to changes in the planned durations of exploratory-shaft construction and underground testing. The time for the construction of the shafts is extended to accommodate recommendations from the technical community for surface-based testing, geologic mapping, as well as various tests that are to be conducted during shaft construction. And the underground testing program is being extended to allow the expanded collection of a more comprehensive body of technical information for the selection of the repository site and licensing.

The time required for the construction of the shafts and for underground testing can now be predicted more accurately because the designs of the shafts are more advanced. In addition, at the sites in basalt and tuff, the DOE is planning to increase the size of the second shafts, the depth to which the shafts are sunk, and the extent of horizontal drifting (see Section A.3 in Appendix A). More important, the issues hierarchy delineates, for the first time in a comprehensive and systematic manner, the regulatory requirements for the siting, design, and performance of a repository. Similarly, the issue-resolution strategy is used to delineate, for the first time in a systematic manner, the investigations and tests that must be conducted. These delineations show that significantly more time will be required to provide the level of detail and understanding considered necessary for site selection.

By providing for the collection of more data and a site-characterization program that is based on a detailed issue-resolution strategy, this near-term schedule increases confidence that the time allotted for the next phase--the review of the license application by the Commission--will be sufficient. For example, the extended schedule will allow the license-application designs for the repository and the waste package to be based on data collected during in-situ testing in the exploratory-shaft facility. The extended testing program will diminish the likelihood of encountering problems during the construction of the underground portion of the repository.

In the revised schedule, the DOE expects to send the site-selection report to the President in late 1994 and to submit the license application to the Nuclear Regulatory Commission approximately 60 days later, in early 1995, as soon as site designation becomes effective. The revised schedule allows 9 more months for the Commission to review the application and to issue a construction authorization in early 1998. The construction of the repository could then start in 1998 and, as in the 1985 Mission Plan, proceed in two phases. Phase 1 operations could begin approximately 5 years later, in 2003, at a spent-fuel receipt rate of 400 metric tons of uranium per year. Phase 2 operations could begin in 2006. In addition, in the year 2008, the repository will be able to start receiving high-level waste generated in defense activities* and commercial high-level waste from a demonstration project in West Valley, New York. The revised schedule is compared against the schedule of the 1985 Mission Plan in Table 1.

The effect of the schedule extension on the costs of the program will be examined in the next annual fee-adequacy report that the DOE will submit to the Congress, as required by the Act.

Recognizing that the licensing schedule is necessarily aggressive and to help ensure the receipt of a construction authorization early in 1998, the DOE intends to make maximum use of the near-term schedule extension. In particular, its plans call for the following:

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*A notice of inquiry and request for public comment on an equitable allocation of fees for defense-waste disposal was published by the DOE in the Federal Register on December 2, 1986.[30]

Table 1. Schedule for the first repository[a,b]

Milestone	Current schedule	1985 Mission Plan schedule
Start of exploratory-shaft construction		
Tuff	Second quarter 1988	Third quarter 1986
Basalt	Third quarter 1988	Third quarter 1986
Salt	Fourth quarter 1989	Third quarter 1987
Start of in-situ testing		
Tuff	Fourth quarter 1989	Third quarter 1988
Basalt	First quarter 1992	Fourth quarter 1988
Salt	Fourth quarter 1991	Second quarter 1989
End of site characterization[c]		
Tuff	First quarter 1992	Third quarter 1989
Basalt	First quarter 1993	Third quarter 1989
Salt	First quarter 1993	Third quarter 1989
Draft environmental impact statement	Fourth quarter 1993	Third quarter 1990
Final environmental impact statement	Fourth quarter 1994	Fourth quarter 1990
Submittal of the site-selection report to the President	Fourth quarter 1994	First quarter 1991
Submittal of the license application to the Nuclear Regulatory Commission	First quarter 1995	Second quarter 1991
Receipt of a construction authorization from the Nuclear Regulatory Commission	First quarter 1998	Third quarter 1993
Start of construction	First quarter 1998	Third quarter 1993
Start of phase 1 operations	First quarter 2003	First quarter 1998
Start of phase 2 operations	Second quarter 2006	First quarter 2001

[a] The schedule is given in calendar-year quarters.

[b] This schedule is based on a budget requirement of $725 million for fiscal year 1988.

[c] End of the testing necessary for the selection of the repository site and the preparation of the draft environmental impact statement.

1. Provisions for greater involvement by the States and affected Indian Tribes in the technical program.
2. The implementation of, and interactions with the Nuclear Regulatory Commission on, a quality-assurance program that will fully satisfy the Commission's requirements for the acquisition of data used in the licensing process.
3. Interactions with the Nuclear Regulatory Commission on technical issues, using available options (e.g., rulemaking) to resolve issues.
4. The implementation of a program of licensing topical reports, which will allow the NRC staff to consider various issues before the submittal of the license application and should greatly reduce the volume of material to be included in the application.
5. The implementation of the issue-resolution strategy, which is based on the performance-allocation process requested by the Nuclear Regulatory Commission.
6. The development and operation of a licensing support system that will provide storage and retrieval for specified licensing information.

WASTE-ACCEPTANCE STRATEGY

The DOE has entered into contracts with the owners and generators of spent nuclear fuel and high-level waste.[31] The contract provides for the DOE's acquisition of title to the spent nuclear fuel and high-level waste, transportation, and subsequent disposal. Under the contract, these services are to be provided "after commencement of facility operations, not later than January 31, 1998." The strategy preferred by the DOE to allow waste acceptance to begin by 1998 includes an integral MRS facility, which would also achieve the broader goal of improved operating efficiency for the system.

Without approval of the MRS proposal, the 5-year extension of the schedule for the first repository would require a change in the waste-acceptance strategy.

Some have suggested the option of using the Federal interim storage (FIS) authorized by the Act. Such storage is allowed to accommodate 1900 metric tons of uranium, or nearly as much as the first repository would have accepted in its first 4 years of operation. However, this option must be triggered by each utility that wishes to use Federal interim storage, justifying to the Nuclear Regulatory Commission by 1990 why it could not provide adequate capacity for spent fuel in 1998 and beyond. The FIS option is also limited in that the DOE cannot contract for such storage after January 1, 1990 (Section 136(a)(1) of the Act).

An illustrative waste-acceptance schedule that accounts for the rebaselined schedule for the first repository, a proposed schedule for the MRS facility, and the new schedule for the second repository (discussed below) is presented in Appendix F.

THE MRS FACILITY

As explained in the 1985 Mission Plan, an integrated MRS facility would provide a facility, central to the majority of operating reactors, that prepares spent fuel for emplacement in a repository; serves as the central receiving station for the waste-management system; and, with a limited storage capacity (15,000 metric tons of uranium), acts as a system buffer that would allow continued waste acceptance regardless of changes in the schedule of waste emplacement for the first several years of operation at the first repository (see Appendix C for a more detailed description).

In comparison with other options, the greatest advantage of an MRS facility is that it would be an integral and productive component of the waste-management system rather than a temporary reactor-specific expedient like at-reactor storage. Another important consideration is the broadly shared view of its feasibility. Studies have shown that such a facility could start receiving spent fuel in 1998, at a rate initially exceeding that of phase 1 operation at the first repository, thus minimizing the effects of the rescheduling of the first repository on utilities and their ratepayers.

As explained in Appendix C, the DOE has prepared a proposal for the construction of an MRS facility and will submit this proposal to the Congress as soon as practicable. To allay concerns that the MRS facility could become a substitute for a permanent repository, whose development remains the highest priority, the DOE will ask the Congress to limit the MRS storage capacity to 15,000 metric tons of uranium and to specify that the MRS cannot start receiving spent fuel until a construction authorization for the repository has been received from the Nuclear Regulatory Commission.

DELAY OF THE SECOND REPOSITORY

On May 28, 1986, the Secretary of Energy announced his decision that it would be prudent to postpone site-specific activities for the second repository. In conjunction with taking steps to implement this decision, the DOE subsequently explained that a Mission Plan amendment detailing the basis for the decision would be submitted to the Congress for its consideration.

As explained in more detail in Appendix D, the Secretary's decision was based on a number of factors, including declining projections of the rates at which spent fuel will be discharged from commercial nuclear power plants, progress in siting the first repository and confidence in finding suitable sites among the three sites approved by the President for site characterization, the advantages to be gained from the experience of the first repository, the expectation of Congressional approval for the MRS facility, and fiscal management and responsibility.

The DOE wishes to emphasize that even the lowest current projections of spent-fuel generation (see Appendix E) indicate that the second repository will be needed. It therefore remains firmly committed to a two-repository system and, to this end, intends to continue with a technical program for the second repository. As described in more detail in Appendix D, current plans for this program include non-site-specific studies of potential host rocks, the development of analytical approaches for the evaluation of non-site-specific geologic settings in terms of long-term performance, and an enhanced program of international cooperation.

The specific requirement related to the second repository is stated in the Act in terms of the maximum amount of spent nuclear fuel that the Nuclear Regulatory Commission can allow to be emplaced in the first repository until a second repository is in operation. The Act sets this figure at 70,000 metric tons of uranium. Under the revised schedule for the first repository, this limit would be reached only after the year 2025 if the annual rate of waste emplacement is 3000 metric tons of uranium. The actual schedule for the second repository, however, is yet to be determined; it will depend on more-refined estimates of spent-fuel generation rates, the time needed for the first repository to reach the limit of 70,000 metric tons of uranium, and the time needed to develop the second repository.

The experience of siting the first repository suggests that site-specific screening leading to the identification of potentially acceptable sites should start about 25 years before the start of waste acceptance for disposal. Thus, to have the second repository available by about 2025, site-specific studies need not start until the middle to late 1990s.

With a later decision on the siting of the second repository, a more appropriate scale of operations for that facility can be established. In addition, a longer period of time between the startup of the two repositories will permit more experience and knowledge gained in the development and operation of the first repository to be used for the second repository, providing the opportunity for potential technical refinements and cost savings.

CONSULTATION AND COOPERATION

Section 117(c) of the Act requires the DOE to seek to enter into and to negotiate written consultation-and-cooperation (C&C) agreements with eligible States and affected Indian Tribes within 60 days of the approval of a candidate site for characterization (which occurred on May 28, 1986, for the first repository) or earlier if requested by an eligible State or affected Indian Tribe. These agreements are to specify procedures to be followed in areas of mutual concern, such as protecting the health and safety of the public, identifying and mitigating the socioeconomic and environmental impacts of a repository, and educating the public about waste management and disposal. The agreements are to specify procedures for the sharing of technical data and expertise, determining the need for and requesting financial assistance, and mechanisms for resolving conflicts.

Negotiations for consultation-and-cooperation agreements

The DOE has been involved in both formal and informal C&C negotiations with the State of Washington, the Confederated Tribes of the Umatilla Indian Reservation, the Yakima Indian Nation, and the Nez Perce Indian Tribe.

Informal negotiations with the State of Washington commenced before the enactment of the Act, in 1979, with the first formal negotiation session taking place on July 27, 1983. In December 1983, the State negotiating team presented a preliminary draft of a C&C agreement to the State Nuclear Policy and Review Board and the State Nuclear Advisory Council. During the 1984 legislative session, the legislature reviewed the draft and passed a law providing public hearings on, and legislative approval of, any draft agreement. In the fall of 1984, a draft C&C agreement was developed, with mutual concurrence on all provisions except liability and defense waste. A report on the status of C&C negotiations with the State of Washington was sent to the Congress on September 26, 1984. On August 25, 1986, the State of Washington requested an informal meeting with the head of the DOE negotiating team to discuss the C&C process. This meeting was held on October 9, 1986.

Three negotiating sessions with the Confederated Tribes of the Umatilla Indian Reservation (CTUIR) were conducted between August 1985 and October 1985. These initial negotiating sessions were suspended at the request of the CTUIR because of pending Tribal elections. At the request of the CTUIR, the DOE resumed C&C negotiations in July 1986. A fifth negotiating session was held in September 1986, and a sixth occurred in November 1986.

On May 23, 1983, the Yakima Indian Nation requested formal negotiations, which began on July 15, 1983. Negotiations were suspended, however, pending the conclusion of an agreement with the State of Washington.

In June 1986, the DOE began informal discussions on procedural arrangements with the Nez Perce Indian Tribe. A more formal discussion on C&C procedures was conducted in August 1986.

The State of Nevada and the State of Texas have not requested C&C negotiations.

To satisfy the specific requirements of the Act, the DOE, on July 25, 1986, sent letters to the three States with candidate sites for the first repository and three affected Indian Tribes, expressing its desire to begin the process that would lead to signed C&C agreements. The DOE also expressed its intention to meet with the representatives of those States and Tribes to discuss the C&C activities to date, review the scope and the parameters of C&C agreements, and discuss provisions that might be common to all such agreements. The affected parties, however, responded that they preferred individual meetings. Accordingly, on November 19, 1986, the DOE wrote to each of the three States and the three affected Indian Tribes, requesting that individual negotiations begin or resume.

The Act also directs the DOE to submit to the Congress a report on the status of negotiations leading to C&C agreements if such agreements are not completed within 6 months after notification that candidate sites have been approved for characterization. The report is to explain why C&C agreements have not been concluded. The Act also specifies that the States and affected Indian Tribes are to have an opportunity to review and comment on this report, and their comments are to be included in the DOE's submittal to the Congress. On December 23, 1986, the DOE sent to the States and affected Indian Tribes copies of the reports that were prepared for the Congress and asked for their comments. As soon as comments are received and addressed, the reports will be sent to the Congress.

Initiatives for consultation-and-cooperation agreements

To date, no formal C&C agreement has been concluded. The DOE recognizes that, given the nature of the program and the reality that the perspectives of the States and affected Indian Tribes often differ from its own, formal agreements may be difficult to reach. At the same time, the DOE also recognizes that the success of the waste-management program may largely depend on the success of institutional relations as well as interactions with the public. The DOE therefore plans to increase its efforts to improve productive institutional relations and to negotiate formal C&C agreements. To this end, the DOE recently invited the eligible States and affected Indian Tribes to meet for the purpose of arriving at a mutually acceptable definition of consultation and cooperation. The participants in this meeting agreed that a mutually acceptable definition would be very useful but felt that it could not be developed in time for inclusion in this Mission Plan amendment. Before submitting the Mission Plan amendment to the Congress, the DOE looks forward to meeting with the States and affected Indian Tribes to continue discussion.

In the meantime, the DOE is considering a number of new initiatives to encourage C&C negotiations. One of these is the concept of generic negotiations with all eligible States and affected Indian Tribes on selected topical issues; the DOE also plans to adopt a procedure for adding to previously negotiated agreements any C&C provision that is later negotiated with a particular State or affected Indian Tribe; and the DOE is prepared to seek the services of third-party negotiators.

FINANCIAL ASSISTANCE AND OTHER MEASURES

Section 116(c) of the Nuclear Waste Policy Act (the Act) contains provisions for financial assistance. In particular, it requires that financial assistance be provided to (1) States containing sites approved for characterization (i.e., candidate sites) and (2) the State containing the site selected for the development of a repository. In the first case, the assistance is for such purposes as monitoring, testing, or evaluation activities with respect to site characterization; providing information to its residents; and reviewing and commenting on documents. In the State chosen for repository development, the assistance is to mitigate the social, economic, environmental and other impacts of repository development and operation; this assistance is to start within 6 months after receiving a construction authorization from the Nuclear Regulatory Commission. Furthermore, in both of the above cases, the State and the unit of general local government in which the candidate site or the repository site is located are to receive each fiscal year an amount equal to the taxes they would receive if site-characterization activities or the repository were taxed like other real property or industrial activities. Similar provisions are made in Section 118(b) for affected Indian Tribes and in Section 141(f) for units of local government in the vicinity of an MRS facility.

It is possible, however, that the public investigation and review carried out by the DOE in cooperation with the States and affected Indian Tribes will show that a waste-management facility may lead to special socioeconomic burdens that were not contemplated when the Act was passed or are difficult to quantify, extend beyond local jurisdictions, or occur earlier than foreseen in the Act. The Congress may therefore wish to consider additional financial assistance to reimburse reasonable and direct expenses incurred.

Where appropriate, the DOE will take actions, available under the Act, to encourage the diversification of the local industrial base, thus contributing to the stabilization of the socioeconomic environment. To the extent practicable, the DOE will rely on the local and regional labor force for both construction and operation labor. Whenever feasible, training programs will be provided through State and local educational institutions to train local residents for the various jobs that will be available at the waste-management facility.

The DOE will also expand information and public education programs to acquaint the public with the management of radioactive waste and to address concerns related to such subjects as safety and environmental impacts. In defining the scope and the format of such programs, the DOE will consult with the host State and the local communities and seek to undertake activities jointly.

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Appendix A

ACHIEVVEMENTS IN THE FIRST-REPOSITORY PROGRAM

Significant progress has been achieved in the program for the first repository through the selection of candidate sites for characterization and advances in technical planning. These developments have affected the decisions and plans described in this Mission Plan amendment. This appendix explains the basis for recommending the candidate sites and the most significant advances in technical planning.

A.1 SELECTION OF CANDIDATE SITES FOR CHARACTERIZATION

The siting process established by the Act

The Act established a step-by-step process for siting the nation's first geologic repository. The first step, the identification of potentially acceptable sites for the first repository, was completed by the DOE in February 1983. The second step, the development of siting guidelines, was completed on November 30, 1984, after extensive public review and comment and concurrence by the Nuclear Regulatory Commission. (The guidelines were published on December 6, 1984, as 10 CFR Part 960.[1])

The third step in the process specified by the Act is the nomination of five sites as suitable for characterization as candidate sites. Each nomination is to be accompanied by an environmental assessment that evaluates the site against the siting guidelines. After the nominations, as the fourth step, the Secretary of Energy is to recommend three of the nominated sites to the President for approval for characterization that is to include the drilling of exploratory shafts and underground testing at the proposed depth of the repository. This step begins when the recommendation has been approved by the President. After site characterization has been completed and an environmental impact statement has been prepared, one of the three sites is to be recommended for development as a repository. This recommendation will be made by the President to the Congress.

Nomination and recommendation for characterization

Draft environmental assessments (EAs) were prepared for each of the nine sites identified as potentially acceptable for the first repository. These documents,[2-10] issued for public review and comment on December 20, 1984, proposed that the following five sites be nominated: Davis Canyon, Utah; Deaf Smith County, Texas; Hanford, Washington; Richton Dome, Mississippi; and Yucca Mountain, Nevada. In addition to requesting written comments, the DOE conducted an extensive program of consultation and outreach, with 50 briefings and 19 public hearings held in 7 States. The comments that were received (more than 20,000 altogether) led to extensive revisions of the EAs and to the development of the decision-aiding methodology that was used in identifying preferred sites for characterization.

Having considered the comments on the draft EAs as well as the available evidence, evaluations, and findings in the revised EAs, the Secretary of Energy determined that the five sites proposed for nomination in the draft EAs should be formally nominated. The nominations were accompanied by final EAs.[11-15] The Secretary then recommended to the President that the Deaf Smith site (Texas), the Hanford site (Washington), and the Yucca Mountain site (Nevada) be characterized as candidates for the first repository.[16] This recommendation was approved by the President on May 28, 1986. The Secretary also made the preliminary determination, required by the Act, that the recommended sites are suitable for development as repositories. The general locations of these sites are shown in Figure A-1.

The events summarized above represent major milestones in the program for the first repository. They represent years of work in gathering and analyzing geologic and environmental data from site studies that began before the enactment of the Act. Each of the environmental assessments consists of some 1000 pages of information and analyses condensed from hundreds of supporting documents.

To facilitate the review of the environmental assessments, all of the supporting documents for a particular assessment were provided to the host State, affected Indian Tribes, and the Nuclear Regulatory Commission; furthermore, all of them were made available for review by the public in the DOE public reading rooms as well as local libraries. In the case of the Hanford site, for example, all of these documents could be seen at 15 libraries in Washington, 4 public libraries in Idaho, and 2 libraries in Oregon. With more than 100,000 pages for each set distributed and 75 sets in all, the DOE has provided a substantial and adequate information base for the reviewers of the environmental assessments.

The basis for the selection of candidate sites

The candidate sites approved for characterization were selected from a set of five sites that were nominated only after passing many increasingly stringent tests in a site-screening process that consisted of several steps and began in the late 1970s. The completion of each step increased the basis for confidence that the remaining sites are technically sound. Descriptions of the screening and nomination processes for each candidate site can be found in the final EAs.[11-15]

The process to be used in recommending sites for characterization is specified by the DOE siting guidelines in Section 960.3-2-3, which requires the recommendation decision to be based on the available geophysical, geologic, geochemical, and hydrologic data; other information; and the evaluations, reported in the environmental assessments, of the sites against the siting guidelines, as required by the Act. The guideline provisions for the diversity of geohydrologic settings and diversity of rock types are to be applied in order to determine the final order of preference.

To aid in identifying preferred sites for characterization, the DOE developed and applied a formal decision-aiding methodology[17] that is based on well-established techniques of decision analysis. The decision-aiding methodology was an elaboration, developed in response to comments, of one of

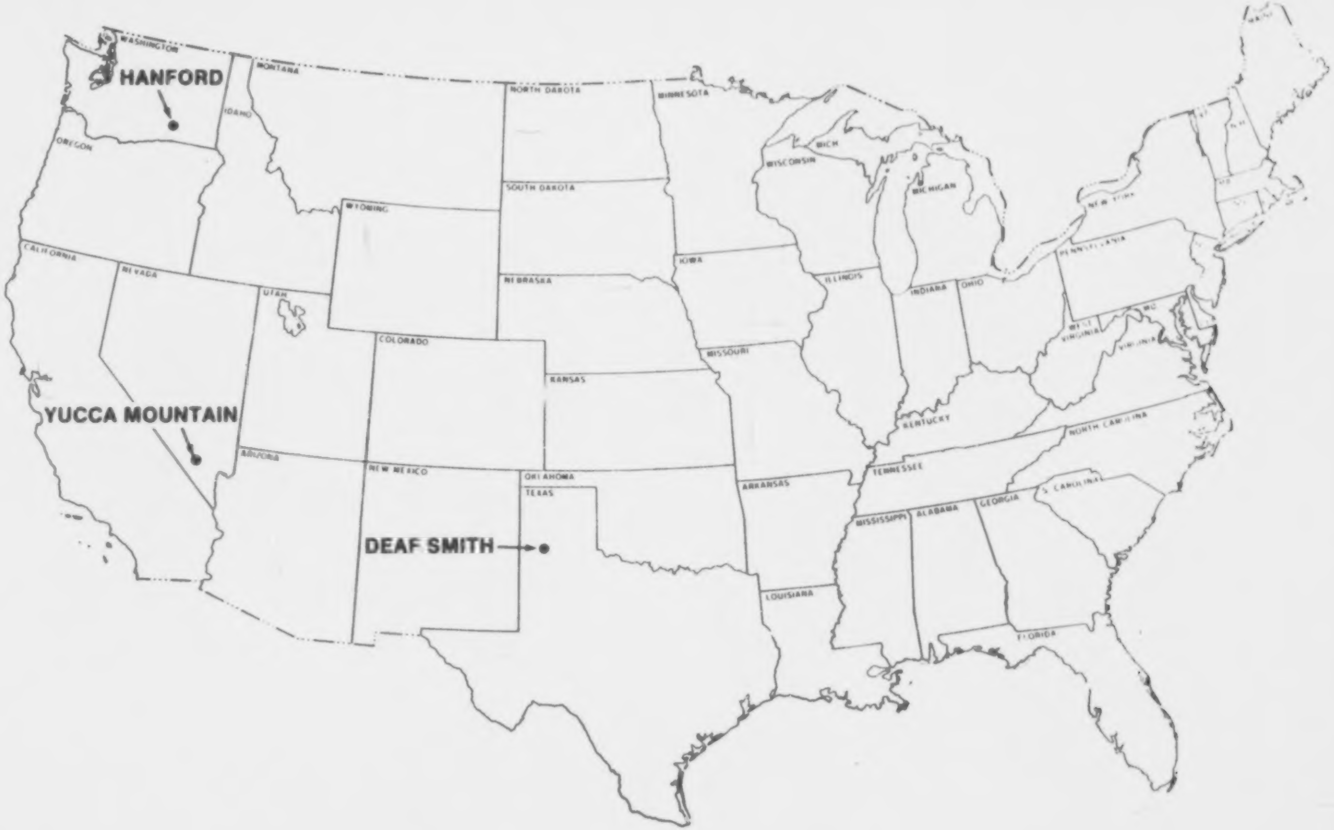
HANFORD
YUCCA MOUNTAIN
DEAF SMITH
WASHINGTON
OREGON
CALIFORNIA
NEVADA
IDAHO
MONTANA
WYOMING
UTAH
ARIZONA
COLORADO
NEW MEXICO
NORTH DAKOTA
SOUTH DAKOTA
NEBRASKA
KANSAS
OKLAHOMA
TEXAS
MINNESOTA
IOWA
MISSOURI
ARKANSAS
LOUISIANA
WISCONSIN
MICH
MICHIGAN
ILLINOIS
INDIANA
OHIO
KENTUCKY
TENNESSEE
MISSISSIPPI
ALABAMA
GEORGIA
FLORIDA
S. CAROLINA
NORTH CAROLINA
VIRGINIA
WEST VIRGINIA
MD
PENNSYLVANIA
NEW YORK

Figure A-1. Location of the three candidate sites for the first repository.

the methods used in the draft environmental assessments to identify preferred sites for recommendation. The DOE also accepted the recommendation of some commenters to submit the revised methodology for review by the National Academy of Sciences.

Accordingly, both the decision-aiding methodology and the proposed approach to its application were reviewed by the Board on Radioactive Waste Management of the National Research Council (the principal operating agency of the National Academy of Sciences and the National Academy of Engineering). In its final comments of April 10, 1986 (reproduced in full in Appendix H of Reference 17), the Board said that it "...believes that the multiattribute utility method used by DOE is a satisfactory and appropriate decision-aiding tool" and is "a useful approach for stating clearly and systematically the assumptions, judgments, preferences, and tradeoffs that must go into a siting decision." The letter goes on to say that "in its review of the implementation of the site-ranking methodology, then, the Board finds much to praise." The Board affirmed that the methodology is best applied only as a decision-aiding tool and agreed that "additional factors and judgments are required to make final decisions about which sites to characterize."

The Board chose not to review the final recommendation of sites for characterization and chose not to have access to the DOE's rankings on preclosure factors. Furthermore, the Board expressed disappointment that the DOE did not follow its recommendation to use independent experts in the assessment process as well as the review of the process, but added that it "has seen nothing to indicate bias in the implementation of the method."

Documented in detail in a report entitled Multiattribute Utility Analysis of Sites Nominated for Characterization for the First Radioactive-Waste Repository,[17] this utility-estimation method allows a complex set of objectives to be divided into component parts for evaluation and then to be recombined in a logical manner. As such, this methodology is well suited to the first step of the decision process where the separate postclosure and preclosure objectives are considered individually and then collectively. The methodology is constructed to elucidate the uncertainties inherent at this state of the siting process, and it is explicit in identifying the relative advantages and disadvantages of the sites. In addition to technical data and the judgment of technical experts, these factors include value judgments by policymakers.

In applying the methodology, the DOE identified two principal objectives for the postclosure period: (1) minimize the adverse health effects from the repository during the first 10,000 years after closure and (2) minimize the adverse health effects from the repository during the period 10,000 to 100,000 years after closure. For both objectives, the performance of the sites was measured against the limits established by the Environmental Protection Agency (EPA) in 40 CFR Part 191 for cumulative releases of radionuclides to the accessible environment. The results showed that all of the five nominated sites would be expected to perform extremely well in isolating waste from the environment: even the highest release (for the lowest-ranked site) under expected repository conditions was estimated to be 500 times lower than the EPA limit, and the small differences among sites were judged to have no practical significance.

For evaluating performance before closure, four objectives were identified: (1) minimize adverse impacts on health and safety before closure, (2) minimize adverse environmental impacts, (3) minimize adverse socioeconomic impacts, and (4) minimize economic costs. Eight more-detailed objectives were defined for the first objective, three for the second objective, one for the third objective, and two for the fourth objective. The results show that all of the sites are expected to perform well. When performance against all 14 of these factors was aggregated, it was found that the Yucca Mountain site in Nevada would be expected to cause the fewest impacts, followed by the Richton site (Mississippi), the Deaf Smith site (Texas), the Davis Canyon site (Utah), and the Hanford site (Washington). However, this ranking is dominated by undiscounted costs--a very uncertain basis for decisionmaking at this stage in the design of the overall waste-management system. If all the performance objectives except economic costs are aggregated, the Hanford site shows the fewest impacts, followed by Yucca Mountain, Deaf Smith, Richton, and Davis Canyon.

As described in the report[16] documenting the Secretary's recommendation, the three sites recommended and approved for characterization also provide the maximum diversity of geohydrologic settings and rock types. Host-rock diversity protects against the occurrence of deficiencies or failures that are inherent in a particular type of rock and hence would be common to all sites in that rock. It also provides an opportunity to consider, during the site-selection process, the advantages of alternatives in the design of the repository, the design of the "waste package" (i.e., the waste form, any containers used to provide containment for the waste, and the packing material surrounding the containers), options for maintaining waste retrievability (which is required by the Nuclear Regulatory Commission for up to 50 years from the start of waste emplacement), and alternatives in allocating levels of performance to the natural and the engineered barriers of the repository (this performance-allocation process is discussed in the next section). The need to consider rock diversity was also acknowledged by the Board on Radioactive Waste Management of the National Academy of Sciences: "...There are other factors that must be taken into account in the final decision to select three sites for characterization. These include the diversity of rock types...."

The insights obtained through the decision-aiding methodology, the performance predicted by the methodology, and the potential advantages of diversity led to the determination that the three sites recommended and approved for characterization offered, on balance, the most advantageous combination of characteristics and conditions for the successful development of repositories at such sites. The DOE believes that these sites are indeed suitable for a repository, recognizing that the demonstration of suitability must await the results of site characterization and full performance assessments against regulatory requirements.

[illegible] THE ISSUES HIERARCHY AND THE ISSUE-RESOLUTION STRATEGY

To guide the process of site characterization and to ensure that all the data required for site selection and licensing will be available when needed, the DOE has developed two basic organizing principles. The first of these principles is the "issues hierarchy," which states the questions about the performance of the repository system that must be resolved to demonstrate compliance with the applicable Federal regulations. The second principle is a strategy for resolving each issue. In addition to discussing these principles, this section also presents a brief description of current plans for site-characterization activities at each candidate site.

The issues hierarchy

The issues hierarchy, which is described in more detail in a recent DOE report,[18] is a three-tier framework that lays out what must be known before a site can be selected and licensed. It is based on the issues-hierarchy concept presented in the 1985 Mission Plan[19] (Volume I, Part II, Chapter 1). The hierarchy in the 1985 Mission Plan was modified in order to make explicit the requirements of the EPA standards[20] in 40 CFR 191 and the NRC technical criteria[21] in 10 CFR Part 60, to accommodate the performance-allocation process described below, and to accommodate different categories of issues (performance, design, and characterization).

Each tier contains progressively more detail than the tier above it. The highest tier consists of the four "key issues." Stated as questions, they are derived from the system guidelines in the DOE siting guidelines; they therefore embody the principal requirements established by the regulations governing repositories. Each of the key issues is followed, in the second tier, by three groups of issues related to (1) performance, (2) design, and (3) characterization. These issues expand on the requirement stated in the key issue they represent. When each group of issues was constructed, an effort was made to include in the group all the questions that must be answered to resolve the key issue.

The third tier consists of "information needs," which are stated as requirements for technical information, rather than as questions. In constructing the information needs, the DOE attempted to list all the important information necessary for resolving the issues.

The issues hierarchy is useful in site characterization because it establishes a framework for developing the test program and for explaining why the test program is adequate and necessary. The test program will be adequate if it adequately addresses all the information needs in the third tier of the issues hierarchy. And the necessity for any particular planned test can be established by determining its role in supplying an information need.

The issue-resolution strategy

To resolve the issues in the issues hierarchy, the DOE has adopted a general "issue-resolution strategy" that guides the development of specific plans for resolving each issue. This general strategy is a procedure consisting of as many as 12 steps; it is outlined in Figure A-2. Three of the steps, applied separately to each issue, lead to the identification of the information necessary to resolve the issue. Once the information needs have been identified, another step leads to the development of plans for acquiring that information. The reasoning used in carrying out those four steps is, then, the rationale for the particular site-characterization activities that

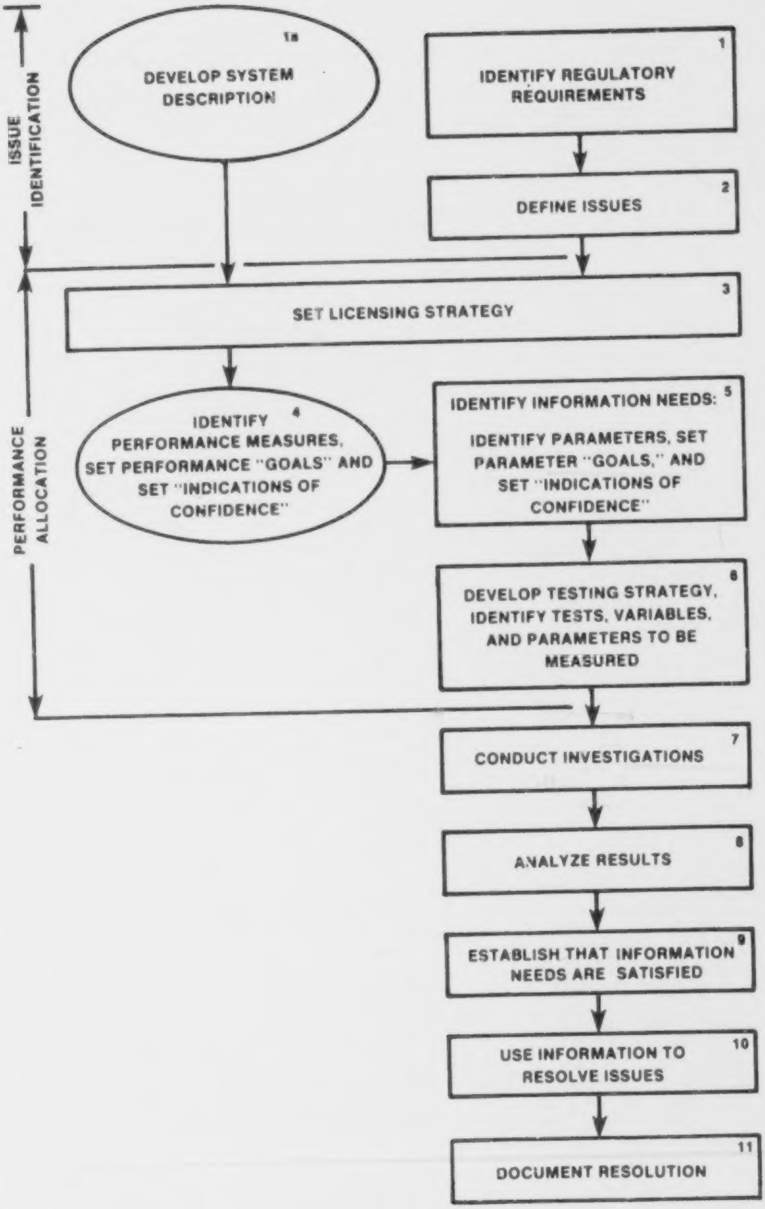
ISSUE IDENTIFICATION
PERFORMANCE ALLOCATION
1a
DEVELOP SYSTEM DESCRIPTION
1
IDENTIFY REGULATORY REQUIREMENTS
2
DEFINE ISSUES
3
SET LICENSING STRATEGY
4
IDENTIFY PERFORMANCE MEASURES, SET PERFORMANCE "GOALS" AND SET "INDICATIONS OF CONFIDENCE"
5
IDENTIFY INFORMATION NEEDS:
IDENTIFY PARAMETERS, SET PARAMETER "GOALS," AND SET "INDICATIONS OF CONFIDENCE"
6
DEVELOP TESTING STRATEGY, IDENTIFY TESTS, VARIABLES, AND PARAMETERS TO BE MEASURED
7
CONDUCT INVESTIGATIONS
8
ANALYZE RESULTS
9
ESTABLISH THAT INFORMATION NEEDS ARE SATISFIED
10
USE INFORMATION TO RESOLVE ISSUES
11
DOCUMENT RESOLUTION

Figure A-2. Issue-resolution strategy.

are intended to resolve the issue. The rationale and the plans for these activities will be described in the site-characterization plans.

Issue identification. The first section of the strategy, labeled "issue identification" in Figure A-2, consists of three steps. Step 1 identifies the regulatory requirements, and from these requirements the issues are derived (step 2). Also necessary to proceed to the formulation of specific plans for the resolution of each issue is a detailed description of the repository system (step 1a).

Performance allocation. The second section of the strategy, called "performance allocation," consists of the steps that provide the rationale for the establishment of particular site-characterization activities. The performance-allocation concept was proposed by the Nuclear Regulatory Commission and developed in formal discussions, documented in a written agreement, between the DOE and the Commission.[22]

The steps in performance allocation were defined with several objectives in mind: to provide specific kinds of information, requested by the Nuclear Regulatory Commission, to provide uniform guidance for site characterization at all candidate sites, and to ensure program-wide consistency in implementing the performance-allocation process.

The first step in performance allocation (step 3 in Figure A-2) is the adoption of a "licensing strategy." This step uses available information to develop, for planning purposes, a statement of the site features, engineered features, conceptual models, and analyses that the DOE expects to use in resolving the issue. The statement is called a "licensing strategy" because the combined statements developed in step 3 for all the issues are the basis for the current DOE plans to show compliance with regulations. In the site characterization plans, the licensing strategy is preliminary: not enough information is available for a definitive plan, because site characterization is only beginning. But the strategy is sufficiently developed to guide planning for tests and analyses and to make clear what activities are necessary and whether they will be sufficient to resolve the issue.

The principal product of step 3 is a statement of the repository-system components on which the DOE currently intends to rely in resolving the issue: if these components perform as the licensing strategy expects them to perform, the issue is likely to be resolved. The statement may also identify, for each component, specific features that the DOE expects will contribute to the performance of the component and hence to the resolution of the issue.

Step 4 carries the strategy further by establishing "performance measures" for the components identified in step 3. These measures are physical quantities that describe the performance of the component in meeting the licensing strategy. These measures may be directly measurable quantities, or they may be quantities derived from other quantities that are more directly measurable.

Each performance measure has a "goal." The goal is not a target that the performance measure must attain if the repository is to perform properly, and therefore it is not a "goal" in the sense that it has to be met. It is simply a guide for developing a testing program--a guide that states the licensing strategy quantitatively and can be changed or even discarded once the testing program has been established. The goals are, therefore, guides for deciding, in the later steps of performance allocation, what information must be provided by the testing program. As a further guide for testing, step 4 accompanies each performance goal with an "indication of confidence," which expresses, as quantitatively as possible, the confidence with which the licensing strategy desires the testing program to show that the performance goal has been attained.

The performance-allocation process then proceeds to develop specific requirements for future work. Step 5 identifies "information needs," which state, for each issue, the categories or types of information needed to resolve the issue. Part of the development of an information need is the identification of the "parameters" needed to evaluate the performance measures. As already mentioned, many performance measures (e.g., the time of ground-water travel through a particular geohydrologic unit) are not directly measurable quantities. However, they can usually be expressed by an equation in which quantities that can be measured more directly (e.g., hydraulic conductivity) appear as parameters. Step 5 furthers the development of plans for testing by listing these parameters. It also assigns to each parameter an acceptable or desirable value, called a "goal" in Figure A-2. Like the performance goals, these parameter goals are not values that must be achieved by the repository system. They are statements of the values that the licensing strategy expects the parameters to take. Step 5 also specifies where possible an indication of confidence for each parameter. Like the indicators for performance goals, these indicators are seldom numerically rigorous, but are as quantitative as possible.

Step 6 in Figure A-2 expresses the use of the information needs, as expressed in detail in step 5, to define the activities that will produce the needed information. The lists of parameters or other information that must be obtained, together with the supporting requirements for achieving confidence in this information, are the basis for a testing or analysis strategy.

Investigations. After the performance allocation has produced the plans for resolving issues, the issue-resolution strategy proceeds with the investigations called for in the plans (step 7 in Figure A-2). The analyses of the results of the investigations (step 8) begin as soon as the results are available and continue throughout the site-characterization period and beyond. These analyses include all the evaluations needed to resolve the issues. The collection of needed information continues until the information needs have been satisfied (step 9). The collected information is then used in a concluding set of analyses that finally resolve the issues (step 10), and the resolution is documented (step 11).

Application of the issue-resolution strategy. The entire issue-resolution strategy is intended to be iterative. The licensing strategy as well as the goals and the indications of confidence for the performance measures and related parameters may be changed as new information becomes available; if they are changed, the steps that follow in the issue-resolution strategy will also be reexamined and their products revised. The analyses of the results of the investigations (step 8) may produce new understandings that require rethinking of earlier steps. Any of the steps may lead to revisions of earlier steps.

This iterative process will furnish a vehicle by which the DOE will communicate to the Nuclear Regulatory Commission, the States, and affected Indian Tribes the approaches that it intends to use in resolving the issues in the issues hierarchy. As already mentioned, the current versions of the strategies are preliminary and intended simply as a basis for initial planning; they are expected to be the primary focus for comments and discussions between the DOE and the reviewers of the site-characterization plans.

The rationale for future changes to the issue-resolution strategies will be documented in semiannual site-characterization progress reports, which will also report the results of site-characterization studies. The reviews, interactions, and reporting will continue until the license application is submitted to the Nuclear Regulatory Commission.

A.3 PLANS FOR SITE-CHARACTERIZATION ACTIVITIES

To demonstrate that a candidate site is suitable for a repository and meets the siting guidelines (10 CFR Part 960),[1] it is necessary to conduct a program of site characterization. For the first repository, this program began when the President approved the sites recommended for characterization (May 28, 1986). As described in the environmental assessments for the candidate sites,[11-13] site characterization consists of surface-based investigations (e.g., seismic surveys), investigations conducted by means of deep and shallow boreholes, laboratory tests, and, most important, tests conducted in the host rock at the proposed depth of the repository. The latter can be performed only by constructing an exploratory-shaft facility.

Before proceeding to sink shafts at any site, the DOE must submit, for review and comment, a site-characterization plan (SCP) to the Nuclear Regulatory Commission, the Governor and legislature of the State, the affected Indian Tribes, and the public. This plan will describe the investigations and tests identified as necessary by the issue-resolution strategy discussed in the preceding section. The sinking of shafts will start after public hearings have been held in the vicinity of the site.

The exploratory-shaft facility at each candidate site will consist of two exploratory shafts, a tunnel that connects the shafts, other tunnels and underground rooms for testing, and associated surface facilities. Both shafts will be sunk at the same time or one after the other, depending on the site. The shafts will be outfitted to support the ventilation system; the underground utility, safety, and communication needs; and the conveyances for mined rock, personnel, and materials. The development of the underground workings will start as soon as the first shaft is sunk to full depth and is sufficiently equipped. As stated in the 1985 Mission Plan,[19] the DOE intends to use the exploratory shafts during the construction of the repository and is evaluating the most cost-effective use of the shafts in the operating repository.

Testing will be conducted in two phases. The first phase, construction testing, is defined as the tests and investigations starting with shaft construction and continuing until the underground connection of the shafts is completed. The second phase, in-situ testing, will start at the completion of construction testing and continue until sufficient data have been collected. These tests will concentrate on characterizing the rock mass; they will assess in-situ stress, permeability, thermomechanical parameters, geochemical properties, thermal properties, heat dissipation, and the like. More-detailed descriptions of the testing program can be found in the environmental assessments for the candidate sites.[11-13]

The testing will produce two compilations of data. The first will address the site-suitability requirements of the siting guidelines and will be used for the preparation of the draft environmental impact statement; the second will address the license-application requirements of the Nuclear Regulatory Commission. For the most part, the data for both compilations will be collected from the same tests with different data-cutoff dates.

The issue-resolution strategy and more advanced design studies have resulted in major changes in the plans for the exploratory-shaft program at each candidate site. The revised plans are briefly reviewed below. The effects of these changes on the schedule for the first repository are discussed in Appendix B.

Plans for the Hanford site (basalt)

At the Hanford site, the sinking of the shafts will be preceded by a large-scale hydrologic testing program to measure potential fracturing between aquifers. Portions of this program must precede the excavation of exploratory shafts because drilling to a depth of more than 600 feet (i.e., the top of the basalt formation) may interfere with the hydrologic testing.

According to current plans for the Hanford site, one of the exploratory shafts will have an inside finished diameter of 6 feet; the other shaft is expected to have an inside diameter of 10 to 12 feet, to satisfy the site-characterization needs identified by the issue-resolution strategy. The 1985 Mission Plan reported that both shafts would be 6 feet in diameter. Both shafts will be sunk to a depth of approximately 3400 feet, and both will be lined to a depth of 3300 feet with a steel liner equipped with portholes for testing. The shafts will be excavated by drilling. The design requirements for the exploratory-shaft facility are being revised to include the latest criteria for quality assurance, testing flexibility, and licensing.

Underground drift excavations are expected to be as much as 3400 feet of tunneling rather than the 1500 feet reported in the 1985 Mission Plan.[19] Concurrently with the final drifting, in-situ testing at a depth of 3100 feet will begin.

Plans for the Yucca Mountain site (tuff)

It is currently expected that both of the exploratory shafts at Yucca Mountain will have finished inside diameters of 12 feet rather than 6 and 12 feet as reported in the 1985 Mission Plan.[19] Both shafts will be excavated by conventional drilling-and-blasting methods, and both will be lined with concrete for their full length. The first shaft will extend to 1450 feet, below the depth proposed for the repository (1020 feet); it will have breakouts for testing at the 580-, 1020-, and 1400-foot levels. Extending the shaft to a depth of 1450 feet will allow the DOE to examine the geologic formation that lies below the formation proposed for the repository and consist of rock with somewhat different properties. The second shaft will extend only to the main breakout level at 1020 feet. Design requirements for the exploratory-shaft facility are being revised to include the latest criteria for quality assurance and licensing.

Most of the testing will be conducted from one of the shafts in the main testing area at the 1020-foot level. The main testing area is expected to be much larger than that reported in the 1985 Mission Plan: approximately 9600 versus 1250 linear feet. This will allow the DOE to explore geologic features within and around the area considered for the repository.

Plans for the Deaf Smith site (salt)

The sizes of the exploratory shafts at the Deaf Smith site are the same as those reported in the 1985 Mission Plan: both shafts will have a finished inside diameter of 12 feet. Both shafts will be excavated by conventional methods (drilling and blasting) to a depth of 2600 feet and will require ground freezing before excavation to 1100 feet. They will be lined with concrete and steel, either to the full depth or to the bottom of the lowest major aquifer. The shaft liners will be watertight in order to seal possible water-bearing zones below the aquifers; they may extend to a level of 2100 feet below the surface. Seals will be used behind the liner to protect the quality of the water in the aquifers and to inhibit the inflow of water to the test horizon. Underground drift excavations will be approximately 5400 feet in length (the same as in the 1985 Mission Plan).

The final design of the exploratory-shaft facility requires the drilling of an engineering design borehole, which cannot be done until the DOE obtains access to the site. The design will reflect any changes required by new data gathered from the engineering design borehole, flexibility studies, and the requirements of quality assurance and licensing.

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Appendix B

THE SCHEDULE FOR THE DEVELOPMENT OF THE FIRST REPOSITORY

This appendix presents the revised schedule for the first repository. The discussion is limited mainly to the activities that are on the critical path. However, the schedule for activities that are not on the critical path was also reviewed to determine their potential for affecting the schedule.

B.1 SCHEDULE ASSUMPTIONS

The revised schedule for the first repository is based on the following major assumptions:

1. The schedule is success oriented but achievable. The achievement of the schedule will require the DOE's best efforts.

2. The work effort must be based on technical excellence and quality. All aspects of the program (design, testing, analysis, etc.) must be executed with emphasis on technical accuracy and completeness. Products must be defensible and usable.

3. Adequate resources, both manpower and budgetary, are available. The schedule is not constrained by funding or manpower limitations in fiscal year 1988 and beyond.*

4. Work will proceed at all three sites as expeditiously as possible. Although the projected schedule shows that the tuff site could finish site characterization before the salt and the basalt sites, work will go forward as quickly as possible at all three sites.

5. The construction of exploratory shafts at each site has the highest priority. At all three sites the critical path in the schedule involves the exploratory shafts and the in-situ testing programs.

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*The schedule presented in this amendment is based on a budget requirement of $725 million for fiscal year 1988; a budget amendment is being prepared for submittal to the Congress after the resolution of pending issues regarding the scope and the pace of the program.

B.2 MAJOR PHASES OF THE REPOSITORY SCHEDULE

The DOE has examined the steps that lead to the beginning of repository operations and, for purposes of this discussion, has divided them into four major phases:

1. Site characterization.
2. Site selection and approval.
3. Licensing review by the Nuclear Regulatory Commission (NRC).
4. Repository construction.

Table B-1 shows the major activities in each of these phases for the first repository. Each phase contains many other activities that have not been included in this list because they are not as critical to the schedule as those shown.

Table B-1. Major phases of the repository program

1. SITE CHARACTERIZATION
   Site-characterization plans issued
   Land acquired and applicable permits obtained
   Exploratory shafts constructed
   Site characterization conducted to acquire data for the draft environmental impact statement
2. SITE SELECTION AND APPROVAL
   Draft environmental impact statement issued
   Final environmental impact statement issued
   Site-selection report submitted to the President
   Site recommended by the President to the Congress
   Site designation becomes effective
3. NRC LICENSING REVIEW
   License application submitted to the Nuclear Regulatory Commission (NRC)
   Construction authorization issued by the Nuclear Regulatory Commission
4. CONSTRUCTION OF THE REPOSITORY
   Surface and underground facilities constructed
   Startup testing completed
   License to receive and possess radioactive materials issued by the Nuclear Regulatory Commission
   Operations begin

Most of the discussion that follows is concerned with phases 1 and 2, site characterization and site selection. The assumptions for the last two phases (NRC licensing review and repository construction) remain unchanged from the 1985 Mission Plan, but the durations have been extended, as discussed later.

Site characterization

The activities conducted during the site-characterization phase are directed at acquiring the information necessary to select a site for the repository and prepare the license application. Some of the necessary information can be acquired by surface-based investigations. Other data (e.g., some of the geohydrologic parameters) can be obtained from a systematic series of deep and shallow boreholes and by laboratory testing of mechanical and thermal properties. However, much of the information needed can be obtained only by gaining access to rock at points along the length of exploratory shafts constructed to the depth of the target horizon and by performing tests in an exploratory-shaft facility.

The major milestones for site characterization are as follows:

1. Site-characterization plans are issued in mid-1987 for tuff and basalt and in the first quarter of 1988 for salt.

2. Construction of the exploratory shafts starts in the second quarter of 1988, the third quarter of 1988, and the fourth quarter of 1989 for tuff, basalt, and salt, respectively.

3. Underground connections are made between the first and second exploratory shafts in the fourth quarter of 1989, the fourth quarter of 1991, and the first quarter of 1992 for tuff, salt, and basalt, respectively.

4. In-situ testing begins in the fourth quarter of 1989, the fourth quarter of 1991, and the first quarter of 1992 for tuff, salt, and basalt, respectively.

5. Testing to support the draft environmental impact statement and the site-selection decision is completed in the first quarter of 1992 for tuff and the first quarter of 1993 for salt and basalt.

The sections that follow discuss very briefly the site-characterization activities at each site. More information about the tests to be conducted during site characterization and the design of the exploratory shafts can be found in Section A.3 of Appendix A.

Basalt site. At the basalt site (the Hanford site in the State of Washington) the construction of the first shaft is scheduled to begin in the third quarter of 1988, and the underground connection of the shafts is scheduled for the first quarter of 1992. The final design for the revised exploratory-shaft facility will be conducted in 1987.

The schedule is driven by the need to complete key hydrology tests before starting the construction of the exploratory shafts. With the completion of these key hydrology tests, the 41-month program of exploratory-shaft sinking and underground excavations begins. The two shafts will be drilled sequentially, with 14 months allowed for sinking the first shaft and moving the drill rig to the second site. Concurrently with the start of the second shaft, the first shaft will be outfitted and initial porthole testing will begin within 15 months. Thereafter, completion of the underground shaft connection is timed to coincide with the second-shaft sinking at depth. The completion of drifting will take place 9 months after shaft connection. Concurrently with the final drifting, in-situ testing will begin. In-situ testing for the draft environmental impact statement is currently scheduled to last 12 months, with another 12 months required to collect additional data for the license application.

The license-application (LA) designs for the waste package and the repository are scheduled to permit the incorporation of preliminary in-situ data. The waste-package LA design will require 24 months, with the repository LA design scheduled concurrently. Finally, 3 months is allowed to complete major design and topical reports for the license application.

Tuff site. At the tuff site (Yucca Mountain in Nevada), the construction of the shafts is expected to begin in the second quarter of 1988, and the completion of the underground connection between the shafts is scheduled for the fourth quarter of 1989. Most of the testing will be conducted from one of the shafts, and the other shaft is planned to be completed earlier so that the underground connection can be completed as scheduled.

The schedule for the tuff site is driven by the completion of Title I and II designs for the exploratory shafts; these designs include the increased drifting and a longer second shaft (see Section A.3 in Appendix A). The construction of the first shaft will proceed at a slower pace to permit the required geologic mapping of the shaft walls. Drifting will be completed 10 months after the shafts are connected. Concurrently with the final drifting, in-situ testing will begin. In-situ testing is currently scheduled to last 27 months and will be completed before the issuance of the draft environmental impact statement.

License-application designs for the waste package and the repository are scheduled to permit the use of preliminary in-situ data. The waste-package LA design is planned to require 24 months, with the repository LA design scheduled concurrently, but extending to 30 months to permit final integration of the waste package into the repository system. Finally, 6 months is allowed to complete major design and topical reports for the license application.

Salt site. At the salt site (Deaf Smith County, Texas), the construction of the exploratory shafts is expected to begin in the fourth quarter of 1989, and the completion of the underground connection is scheduled for the fourth quarter of 1991. The final design of the exploratory-shaft facility will start in 1987. Initially, land acquisition and permitting will be the primary activities.

The schedule for the salt site is driven by the permits and the land access required for drilling an engineered-design bore hole (EDBH) to obtain site-specific data for the exploratory-shaft and underground designs. Concurrent with the EDBH drilling and testing, permits must be obtained for shaft sinking. These activities are expected to require at least 18 months after the acquisition of land. Site preparation, which includes roads, surface facilities, headframe, and ground freezing, is planned to require 9 months. The sinking of both shafts will require 22 months, and the connection of the shafts is expected to require 2 months. Drifting to support the in-situ test program will take 5 months, with in-situ testing occurring in parallel. The in-situ test program for the draft environmental impact statement will last 14 months, with another 5 months needed to collect additional data for the license application.

License-application designs for the waste package and the repository are scheduled to permit the use of preliminary in-situ data. The waste-package LA design is planned to require 24 months, with the repository LA design scheduled concurrently, but extending to 30 months to permit the final integration of the waste package into the repository system. Finally, 6 months is allowed to complete major design and topical reports for the license application.

Site selection and approval

The major milestones for site selection are as follows:

1. The draft environmental impact statement is issued in the fourth quarter of 1993, followed by a 90-day public comment period.
2. The final environmental impact statement and the record of decision are issued in the fourth quarter of 1994.
3. The site-selection report is submitted to the President in the fourth quarter of 1994.
4. The President recommends the site to Congress in the fourth quarter of 1994.
5. The site designation is effective in the first quarter of 1995.

Approximately 7 months has been added to this phase of the program to ensure that an adequate draft and final environmental impact statement can be prepared, considering fully input from the States, affected Indian Tribes, other interested parties, and the public.

NRC licensing review

The duration of this activity has been extended by 9 months, from 27 to 36 months.

The major milestones for this phase are as follows:

1. The DOE submits the license application in the first quarter of 1995.
2. The Nuclear Regulatory Commission issues a construction authorization in the first quarter of 1998.

Repository construction

The duration of the construction of the repository has been extended by 7 months. The major milestones for construction, testing, and the start of operations are the following:

1. Repository construction is started in the first quarter of 1998.
2. The DOE submits the updated license application to the Nuclear Regulatory Commission in the third quarter of 2000.
3. Phase 1 construction is completed in the third quarter of 2002.
4. The Nuclear Regulatory Commission issues a license to receive and possess radioactive materials in the first quarter of 2003.
5. Phase 1 operations begin in the first quarter of 2003.
6. Phase 2 construction is completed in the third quarter of 2005.
7. Phase 2 operations begin in the second quarter of 2006 and reach the annual emplacement rate of 3000 metric tons of uranium in 2008.

Appendix C

THE MRS FACILITY

Section 141 of the Act directs the DOE to complete a study of the need for, and the feasibility of, a facility for monitored retrievable storage (MRS) and to submit to the Congress a proposal for the construction of one or more MRS facilities. According to Section 141(b)(1), such a facility is to accommodate civilian spent fuel and high-level waste; permit continuous monitoring, management, and maintenance of these wastes; provide for the ready retrieval of these wastes for further processing or disposal; and safely store such wastes as long as may be necessary by maintaining the MRS facility.

In the spring of 1985, the DOE completed a preliminary need-and-feasibility analysis and announced its conclusion that an MRS facility could serve as an integral and important part of the overall waste-management system.[1] Furthermore, careful analyses of the provisions of the Act and of programmatic options have shown that the performance of the waste-management system could be enhanced by integrating into the system an MRS facility that is centrally located to most of the commercial nuclear reactors. A central location was one of the criteria that led to the identification of preferred candidate sites.[2]

C.1 THE FUNCTIONS AND OPERATIONS OF AN MRS FACILITY

As described in the 1985 Mission Plan,[3] an MRS facility would be fully integrated into the waste-management system. Its principal functions would be to prepare spent fuel for emplacement in a repository and to serve as the central receiving station for the waste-management system. The preparation for emplacement may include removing the spent-fuel rods from the metal grids that hold them together in a square array and consolidating them into a much tighter array. Consolidation offers several advantages, such as a reduction in the number of waste shipments to a repository and a reduction in the number or the size of waste packages requiring handling and emplacement in a repository. Whether consolidated or not, the spent fuel would be loaded into canisters that are uniform in size and free of surface contamination with radioactive material. Such canisters would facilitate handling, shipping, and further processing at the repository.

In addition to its waste-preparation function, an MRS facility would provide limited temporary storage for spent fuel and would contain a storage yard with a capacity of up to 15,000 MTU. The canisters of spent fuel would be stored at the surface, in concrete casks equipped with monitoring instruments and designed for easy retrieval of the spent fuel for shipment to the repository.

The MRS facility would be designed and operated with the fundamental objective of protecting the health and safety of the public, the workers at the facility, and the quality of the environment. It would be licensed by the Nuclear Regulatory Commission.

C.2 THE ADVANTAGES OF AN MRS FACILITY

The most significant advantages of an MRS facility can be summarized as follows:

- Improvements in system development.
- Accelerated waste acceptance from utilities.
- Improvements in the reliability and flexibility of the waste-management system.
- Advantages for the repository.
- Improvements in the specification and performance of the transportation system.
- Institutional benefits.

Each of these advantages is briefly discussed below.

Improvements in system development. The MRS facility would allow the DOE to separate a major part of the waste-management process (spent-fuel acceptance, transportation from reactor sites, consolidation, and sealing in canisters) from uncertainties about the repository and to proceed immediately with detailed planning for, and implementation of, that part. This would provide the utilities with a firmer basis for planning the transfer of spent fuel to the DOE. The development and specification of the transportation system would also be advanced because the approval of the MRS facility would allow specific routing, logistics, and equipment requirements for shipments from reactors to be determined several years earlier. The early accomplishment of these separable steps of the waste-management process would significantly enhance confidence in the schedule for the operation of the total system. Moreover, the MRS facility would provide a focal point for early system integration.

Accelerated waste acceptance from the utilities. By starting in 1998, the MRS facility would allow the system to begin receiving spent fuel 5 years sooner than the system described in this amendment without an MRS facility. This would significantly reduce the need for new temporary storage capacity at reactor sites and the attendant fuel-handling operations, licensing efforts, and costs. It would also provide assurance that the Federal waste-management system will begin operations by 1998 as specified in the contracts between the DOE and the owners of spent fuel.

Improvements in the reliability and flexibility of the waste-management system. Improvements in reliability and flexibility would be realized by separating the function of spent-fuel acceptance from the function of spent-fuel emplacement in the repository and adding significant operational storage capacity to the system. These improvements would significantly increase the manageability of the system and allow the DOE to better accommodate any unexpected circumstances of the future.

Advantages for the repository. By performing waste-preparation functions, the waste-handling facilities and operations of the repository would be simplified. Furthermore, the repository would receive fewer separate shipments; the waste canisters received from the MRS facility would be uniform in size and free from surface contamination with radioactive material; and a large portion of the inventory-accountability function would be performed at the MRS facility. Another important advantage would be the constant rate of waste throughput, which would enhance the efficiency of repository operations.

Improvements in the specification and the performance of the transportation system. By shipping consolidated spent fuel in dedicated trains, the MRS facility would significantly reduce the number of shipments to the repository and reduce the distances of spent-fuel shipments in less-efficient truck-mounted casks. Being centrally located for most reactors, it would serve as a hub for transportation operations, focus the control and management of transportation operations, and reduce the number of cross-country shipping routes. Moreover, by allowing early identification of routes to the MRS site, the MRS facility would provide institutional benefits because it would increase the time available to work with the States, Indian Tribes, and the public on route-specific planning.

Institutional benefits. The development of the MRS facility would produce institutional benefits through the experience gained from interactions with the host State and other parties as well as by allowing the DOE to demonstrate earlier that it is willing and able to be a responsible corporate citizen and neighbor. Early progress in waste management, starting with the designation of a specific site and facility construction, would help provide needed momentum for implementing the entire system.

C.3 STATUS AND SCHEDULE

In December 1985, a draft proposal, including an environmental assessment and a program plan, was prepared for submittal to the Congress early in 1986. Copies of this proposal were sent to the Environmental Protection Agency and the Nuclear Regulatory Commission for comment, as specified in the Act. Concurrently copies were also provided to the State of Tennessee for comments.

However, the DOE was not able to submit the proposal to the Congress as planned because of a suit filed by the State of Tennessee claiming that the DOE had failed to consult properly with the State before the selection of proposed sites for the MRS facility. On February 6, 1986, the U.S. District Court for the Middle District of Tennessee ruled in favor of the State and on February 7 issued an injunction effectively prohibiting the DOE from submitting the MRS proposal to the Congress. The DOE immediately appealed to the U.S. Court of Appeals for the Sixth Circuit and on November 25, 1986, obtained a favorable ruling. The court of appeals ruled that the Federal courts of appeals have original jurisdiction over actions involving the consultation and cooperation requirements applicable to MRS facilities under the Act. The court further held that the actions taken by the Secretary of Energy in identifying sites and in consulting with the State of Tennessee did not violate the Act.

The State of Tennessee immediately filed, on November 25, 1986, a petition for a stay or extraordinary writ of injunction. The DOE responded on November 28 with a motion in opposition and with a countermotion for the immediate issuance of a mandate or the dissolution of injunction. On December 1, 1986, the State filed a motion in opposition to the DOE's countermotion and, on December 4, 1986, filed a petition for a rehearing, with a suggestion that the case be reheard by the full court. The court denied the petition for a rehearing, and subsequently the State requested and was granted a stay pending an appeal to the Supreme Court of the United States. The DOE is awaiting the resolution of these events and intends to submit the proposal to the Congress at the earliest date practicable.

As explained in the 1985 Mission Plan, the DOE had hoped to have an MRS facility ready to start receiving waste in 1996. This date was based on the assumption that congressional authorization to construct the facility would be received in mid-1986. Prompt authorization would still permit the start of MRS operations in 1998. To allay concerns that the MRS facility could become a substitute for a permanent repository, the DOE will recommend that the Congress limit its storage capacity to 15,000 metric tons of uranium and to specify that the MRS facility cannot start receiving spent fuel until a construction authorization for the repository has been received from the Nuclear Regulatory Commission.

C.4 INSTITUTIONAL RELATIONS

Critical to the successful implementation of the MRS facility will be the establishment of an effective working relationship with the host State and local governments. The DOE's proposal to the Congress will outline a comprehensive approach to institutional relations. One of the measures to be proposed is the establishment of an MRS steering committee consisting of persons representing the DOE, the State, local governments, and the public; the purpose of this committee would be to oversee the operations of the facility. Another measure is the immediate development of a consultation-and-cooperation agreement with the host State to delineate a framework for cooperation among all involved parties.

In addition, the proposal will recommend financially compensating the host State and the local communities for the impacts of the MRS facility. The proposed compensation, which is not currently authorized by the Act, would be equivalent to the taxes that a commercial facility of the same value would pay to the local and State governments. It is estimated to total about $15 million per year and would begin the year congressional authorization is received.

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Appendix D

RESCHEDULING OF THE SECOND REPOSITORY

The need for more than one repository was made explicit by the Nuclear Waste Policy Act, which requires the Nuclear Regulatory Commission to prohibit the emplacement in the first repository of more than 70,000 metric tons of uranium (MTU) until a second repository becomes operational. The Act authorizes the siting of the second repository and specifies a schedule for selecting its site; it does not, however, authorize the construction of the second repository.

D.1 HISTORY OF THE SECOND-REPOSITORY PROGRAM

In order to consider additional potential host rocks with characteristics favorable for waste isolation and different from those being investigated for the first repository (i.e., basalt, salt, and tuff), the DOE decided to focus its second-repository siting program on crystalline rocks (granite and high-grade metamorphic rocks similar in composition to granite). A national survey to identify regions with suitable crystalline-rock formations had been begun in 1979, in response to recommendations that additional host rocks be considered for the first repository. This survey had identified three regions (northcentral, northeastern, and southeastern) as being more likely to contain large bodies of suitable rock, and subsequent regional studies indicated nearly 250 crystalline-rock bodies as potentially suitable. In addition, to benefit from studies being performed by other countries that are considering crystalline-rock formations for the disposal of radioactive waste, the DOE started a program of international cooperation and exchange.

In January 1986, the DOE issued a draft area-recommendation report that identified potentially acceptable crystalline-rock sites in 12 areas in 7 States and an additional 8 "backup" candidate areas in the same 7 States.[1] The issuance of this report in final form would have led to preliminary field work in the northcentral, northeastern, and southeastern parts of the country. Because of the postponement of site-specific activities, no work other than a cataloging of comments is planned on this draft report, and the areas identified in the report are no longer under active consideration. Nor are any other sites being considered at present.

D.2 SCHEDULE

For siting the second repository, the Act specifies a process similar to that of the first; for example, the Secretary of Energy is to nominate five sites as suitable for characterization and to recommend three for characterization. Not later than March 31, 1990, the President is to submit to the Congress a recommendation for the second-repository site. Given programmatic considerations and limitations, the DOE has on several occasions modified this schedule. In the 1985 Mission Plan, after evaluating the progress and schedule for the first repository, the DOE extended this site-recommendation date to 1998, with waste emplacement scheduled to begin in 2006; a further revision was announced in the 1986 budget submittal to the Congress. The purpose of these revisions was to ensure that the second-repository schedule would not overlap that of the first repository; it would thus allow information gained in the first-repository program to be applied to the second repository, improving the program and increasing its cost effectiveness.

As announced by the Secretary of Energy on May 28, 1986, the DOE has decided that it would be prudent to postpone site-specific work for the second repository for the reasons explained below. However, the DOE remains firmly committed to a two-repository system and, to this end, intends to continue with a technical program for the second repository; current plans for this program are in Section D.4.

The second-repository decision is consistent with the DOE's priorities: the siting, construction, licensing, and operation of the first geologic repository as well as the development and operation of the transportation system for moving waste to the repository; the determination of the need for, and the feasibility of, monitored retrievable storage (MRS) and the submittal to the Congress of a proposal for the construction of an MRS facility; and, finally, carrying out the activities necessary for the second repository so that when the DOE requests congressional authorization to proceed with construction, there will be a firm basis for that request.

D.3 REASONS FOR DELAYING THE SECOND REPOSITORY

The DOE's decision to reassess its schedule and program for the second repository is due to the following reasons, which are briefly discussed below:

- The continuing progress in siting the first repository and confidence in the suitability of the three sites approved by the President for site characterization.

- The generally declining forecasts of the quantities and rates at which spent fuel will be discharged from reactors.

- Later estimates of the time when the second repository will be needed.

- Prudent fiscal management and responsibility.

- The expectation of receiving congressional approval for developing an MRS facility.

Progress in siting the first repository. The DOE had included in its contingency plans for the first repository the possibility of using a candidate site from the second-repository program. This contingency plan specified that, if none of the sites characterized for the first repository is found suitable, sites under investigation for the second repository could become candidates for the first repository. However, as already explained in

Appendix A, the final environmental assessments and other evaluations of the three sites selected for characterization as candidates for the first repository indicate that suitable sites are likely to emerge from the characterization phase, and hence it is not likely that this contingency plan will be necessary. This eliminates an important reason for site-specific studies for the second repository at present.

Forecasts of waste generation. The Office of Civilian Radioactive Waste Management relies on spent-fuel-discharge forecasts by the DOE's Energy Information Administration (EIA) as a basis for planning. In November 1984, the EIA published a middle-case forecast showing 49,000 metric tons of uranium (MTU) discharged by the year 2000 and 130,000 MTU by the year 2020.[2] These figures, which were used as the planning basis in the 1985 Mission Plan,[3] were less than those being predicted at the time the Act was passed and reflected the latest estimates in a gradually decreasing trend. In December 1985, the EIA adopted a new standard middle-case forecast based on the assump- tion that fuel burnups would gradually increase to 30 percent above current levels by 1993 and then stay constant.[4]

Having updated its forecasts with these assumptions, the EIA showed less than 42,000 MTU by the year 2000 and only 106,000 MTU by the year 2020, a decline of about 15 and 20 percent, respectively. It is important to note that these forecasts, being conservative, assume substantial additions of nuclear electricity-generating capacity in the United States. If this assumption is changed to the case of no new orders for nuclear power plants, the predicted quantities of discharged spent fuel are less than 40,000 MTU in the year 2000 and less than 80,000 MTU in the year 2020. This case was examined as a lower bound. A more-detailed discussion of waste-generation forecasts is given in Appendix E.

The amount of spent fuel available for emplacement in a repository by a certain year is less than the amount of spent fuel discharged by that year. According to the terms of the contract between the DOE and the utilities,[5] the spent fuel that will be accepted for disposal must be at least 5 years old. Thus, for example, the maximum amount of spent fuel available for disposal in the year 2020 is actually the smaller amount of spent fuel that has been discharged by the year 2015.

The uncertainty or range of projections of spent fuel discharged from domestic nuclear reactors is large and increases further out in time when assumptions are based largely on macroeconomic models. However, it is clear that the volume of spent fuel is growing more slowly than expected when the Act was enacted. It is therefore prudent to delay site-specific activity on a second repository until the uncertainties in these data are reduced or a clear picture of the timing for need is in hand.

Estimates of the time when the second repository will be needed. In the Act, the specific requirement in regard to the availability of the second repository is stated in terms of the maximum amount of spent fuel that can be emplaced in the first repository until a second repository is in operation. The Act sets this figure at 70,000 MTU (half of the total quantity expected when the Act was passed). The 1985 Mission Plan presented two illustrative waste-acceptance schedules, one without an MRS facility and one with an MRS facility; both indicated that the first repository would reach the 70,000-MTU limit after the year 2020. The repository is currently designed for an annual receipt capability of 3000 MTU for commercial spent fuel and 400 MTU for high-level waste. The annual receipt rate for spent fuel is approximately the rate of spent-fuel discharge in the 1984 EIA estimates. The repository schedule presented in this amendment (see Appendix B) now extends by at least 5 years the date when the first repository will reach the 70,000-MTU capacity limit. The DOE will continue to monitor all pertinent factors--projections of spent-fuel discharge rates, the rate at which the first repository is filled, and the time needed to develop the second repository--to determine the schedule for the second repository.

The Act establishes a schedule for siting the second repository, but not for construction and the start of operations. (As already mentioned, the Act does not authorize the construction and operation of the second repository.) For the first repository, the Act allows 15 years from the identification of potentially acceptable sites to the start of waste acceptance for disposal (1983 to 1998), but the site-screening studies that led to the identification of potentially acceptable sites had begun in the late 1970s. It therefore seems prudent to plan that site-specific screening leading to the identification of potentially acceptable sites should start about 25 years before the start of waste acceptance for disposal. Thus, to have the second repository available after 2020, site-specific studies need not start until the middle to late 1990s.

The estimate of 25 years is considered to be conservative, because it does not take into account the schedule benefits expected from the first repository. These benefits are expected to be derived from improvements in site screening and characterization (including the issue-resolution strategy discussed in Section A.2), in repository design, in performance assessment, in licensing, and in institutional interactions. Nor does it account for the technology-development program discussed in Section D.4; its performance-based approach to siting should significantly shorten the site-screening process.

Fiscal responsibility. Under the second-repository plan presented in the June 1985 Mission Plan, the DOE projected to spend nearly $700 million through the year 1993 for siting activities leading to site characterization. Under the revised program, expenditures through the year 1993 should total about $200 million.

A preliminary review has determined that the deferral of the second repository will not significantly affect the adequacy of the fee paid into the Nuclear Waste Fund. The delay in major expenditures for the second repository should strengthen the financial position of the program by allowing additional time for earning a return on Nuclear Waste Fund investments or reducing the need for borrowing from the U.S. Treasury. These savings, however, will to some extent be offset by the need to continue some second-repository activities longer than would otherwise be necessary. These effects are being investigated and will be discussed in the next annual fee-adequacy report that will be submitted to the Congress.

Monitored retrievable storage. The DOE plans to submit to the Congress, at the earliest practicable date, a proposal to develop a facility for monitored retrievable storage (MRS). Such a facility would prepare spent fuel for emplacement in the repository and provide temporary storage for up to 15,000 MTU (see Appendix C for more information). It would begin accepting spent fuel in 1998.

The MRS facility is considered to be an integral part of the waste-management system, whether the system contains one or two repositories. It is not viewed as a substitute for the second repository. Designed to provide temporary storage for a limited amount of spent fuel, the MRS facility is distinctly different from a second repository, which is to provide permanent disposal. Nevertheless, while the system is accepting spent fuel, an MRS facility added to a single-repository system does provide some of the benefits to be obtained by adding a second repository at a very early date. (With two waste-acceptance facilities operating concurrently, the waste-management system has the flexibility to divert fuel acceptance between the facilities to maintain a constant acceptance rate if one of the facilities incurs operational delays.) From the standpoint of operational efficiency and reliability, an MRS facility would produce several benefits for the first several years of operation: it would enhance confidence in the schedule, increase the waste-acceptance rate for the initial years of operation, provide transportation benefits, and could allow the siting of a second waste-management facility that is centrally located in relation to the sources of commercial spent fuel.

D.4 TECHNICAL PROGRAM FOR THE SECOND REPOSITORY

As already mentioned, site-specific work for the second repository has been discontinued, but non-site-specific studies of potential host rocks will continue. Thus, though the areas identified as suitable in the draft area-recommendation report[1] for the crystalline-rock program are no longer under active consideration, the DOE will continue non-site-specific studies of crystalline rocks. Furthermore, studies on sedimentary rocks not previously considered will be undertaken. Extensive formations of crystalline and sedimentary rocks are available in many parts of the United States. In addition, the Act states that certain sites from the first-repository program are eligible for consideration in siting the second repository--namely, potentially acceptable sites that were not nominated for characterization as well as sites that have been characterized and found suitable. In siting the second repository, however, both the Nuclear Waste Policy Act and the DOE siting guidelines[6] (10 CFR Part 960) require that regionality in relation to the first repository be considered to the extent practicable.

The term "non-site-specific-studies" means studies directed at determining (1) whether a particular type of host rock, regardless of its geographic location, meets various geologic, hydrologic, geochemical, and rock-mechanics criteria, such as those specified in the siting guidelines; (2) how the host rock would respond to the heat and radiation emitted by the waste; and (3) how well the engineered components of the repository (e.g., the "waste package," which consists of the waste form, a metal disposal container, and any packing material around the container) would perform under the conditions provided by the host rock. Such studies can be based on the scientific literature, information collected by private companies, and data collected in studies performed for the same type of rock in other countries. Site-specific studies, on the other hand, are usually based on data collected at the specified potential repository site and in its vicinity; these could include, for example, drilling boreholes, seismic surveys, and detailed mapping studies.

According to current plans, the program for the second repository will focus on the following:

1. Non-site-specific evaluations of potential host rocks.
2. The development of analytical approaches to evaluate non-site-specific geologic settings in terms of waste-isolation performance.

The latter will require the development of an analytical approach for the selection of geologic settings. This approach will identify the characteristics that a particular type of host rock must have in order to satisfy regulatory requirements for waste isolation given the design of the repository and the "waste package." Because it will integrate geologic characteristics, engineered components, and regulatory requirements--and because it will be based on the experience gained from performance assessments for the first repository--this type of analysis is expected to be associated with a high level of confidence. Thus, whereas the screening process for the first repository progressed from national surveys through regional studies (thousands of square miles), area studies (hundreds to thousands of square miles), location studies (tens to hundreds of square miles), and site studies, a possible strategy for the second repository could allow fewer areas of smaller size to be selected early in the process.

Included in the work discussed above will be the development of mathematical models and computer programs for analyzing the potential waste-isolation performance of a repository in a particular host rock. This effort will be greatly facilitated by the experience gained from the first-repository program, including interactions with the Nuclear Regulatory Commission; nonetheless, the performance-assessment models will need to be tailored to the characteristics of each rock type.

The DOE plans to continue its current program of international cooperation, including cooperative ventures in research; the major example is the research being performed in crystalline rock at the Underground Research Laboratory in Manitoba, Canada. Such cooperative efforts provide for the development of international consensus on issues. A newly established international committee of crystalline-program directors is expected to enhance this collaboration, ensuring that the most cost-effective approaches are considered.

In fiscal year 1986, the DOE terminated the subseabed disposal program, which had been directed at assessing the feasibility of isolating radioactive waste within the thick stable beds of sediments under the ocean floor. This program was terminated because budget appropriations for generic research and development not funded from the Nuclear Waste Fund had been greatly reduced. Accordingly, the DOE announced to the 11 participating international agencies and countries in the Seabed Working Group that it would terminate its participation without prejudice to the potential fesibility of subseabed disposal. As a result, the Seabed Working Group agreed to produce a comprehensive international report on the status and feasibility of subseabed disposal. The DOE is assisting in the preparation of this report, which will be issued in 1987 by the Nuclear Energy Agency of the Organization for Economic Cooperation and Development.

The technology-development program for the second repository is designed to have similar objectives as the first-repository program and to be flexible to the needs of the waste-management program. It is intended to provide a sound basis for acceptance by the technical community and by the public, and its performance-based screening of sites should result in prudent decisions about investments in siting.

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5. U.S. Department of Energy, "Standard Contract for Disposal of Spent Nuclear Fuel and/or High-Level Radioactive Waste," Federal Register, Vol. 48, No. 75, p. 16590, April 18, 1983.

6. U.S. Department of Energy, "General Guidelines for the Recommendation of Sites for the Nuclear Waste Repositories," 10 CFR Part 960, Federal Register, Vol. 49, No. 236, p. 47714, December 6, 1984.

Appendix E

FORECASTS OF SPENT-FUEL DISCHARGE RATES

As a basis for planning, the DOE's Office of Civilian Radioactive Waste Management (ORWM) uses forecasts by the DOE's Energy Information Administration (EIA) of the rates at which spent fuel will be discharged from reactors through the year 2020. The EIA forecasts are generated by computer models that predict the amount of nuclear energy that will be supplied, as well as the corresponding spent-fuel discharges. These models are based on data supplied by the industry and incorporate numerous assumptions on the future deployment and operation of commercial reactors as well as deductions from macroeconomic assumptions of growth rates.

Over the last several years, the EIA forecasts of spent-fuel discharges have shown a generally decreasing trend. This trend has continued since before the passage of the Act, prompting the DOE to reassess the basis that was used in the initial planning for the second repository. Consideration of this trend is one of the principal reasons for delaying site-specific investigations for the second repository, as discussed in Appendix D. This trend as well as the reasons for its occurrence are discussed in this appendix.

E.1 ASSUMPTIONS USED IN EIA FORECASTS

The EIA considers and defines four distinct scenarios for the domestic nuclear-energy capacity from the time each report is published through 2020; these are the optimistic ("high" in 1985 and earlier reports), upper reference ("middle" in 1985 and earlier reports), lower reference ("low" in 1985 and earlier reports), and "no-new-orders" cases. The DOE plans are based on a range of spent-fuel projections encompassed by these cases. Typically, the four scenarios differ in their assumptions through the year 2000 about cancellations or delays for nuclear plants that are being constructed or are on order. For example, in the 1986 EIA report, the lower reference case and the "no-new-orders" case were based on the assumption that nuclear units in the construction pipeline were canceled if they were less than 40 percent complete, if they were indefinitely deferred, if work had been stopped at the site, or if there were severe financial constraints at the end of 1985. For forecasts beyond the year 2000, the EIA uses computer models that are based on assumptions about the growth rates for the gross national product, energy demand, electricity's share of energy use, and the percentage of electricity generated by nuclear power plants. Using such assumptions, current projections for the U.S. commercial nuclear capacity in the year 2020 range from 55 net gigawatts electrical in the "no-new-orders" case to 397 net gigawatts electrical in the optimistic case.

E.2 TRENDS IN FORECASTS OF SPENT-FUEL DISCHARGES

Summaries of recent EIA forecasts are presented in Table E-1, showing the projected cumulative spent fuel for the scenarios considered by the EIA. As shown in Table E-1, the latest EIA projections are substantially lower than the earliest sets of projections shown, including the November 1984 figures that were used as the basis for the 1985 Mission Plan. The 1986 EIA forecasts for the upper reference case, which is equivalent to the middle case of earlier years, shows less than 42,000 MTU by the year 2000 and only 106,000 MTU by 2020, a decrease of about 15 and 20 percent, respectively, from the assumptions used in the 1985 Mission Plan and a decrease of about 35 percent from the 1980 middle-case values shown in Table E-1. The current forecast for the "no-new-orders" case shows only 40,800 and 79,300 MTU in the years 2000 and 2020, respectively.

E.3 REASONS FOR THE DECLINING TREND IN SPENT-FUEL FORECASTS

The reasons for the markedly decreasing trend in forecasts are in part a result of the problems affecting nuclear power in the United States since 1978, the last year in which an order for a nuclear power plant was placed. A reduced growth rate in the demand for electricity, financial constraints on utility companies, a flow of new regulations and safety requirements, delays in construction and cost escalations, and various operational difficulties that limited the productivity of nuclear power plants are some of the difficulties that the industry had to face. These factors have reduced the demand for new central-station power plants, which in turn reduced the construction of domestic nuclear power plants.

Table E-1. Summary of spent fuel forecasts by the Energy Information Administration
(In metric tons of uranium)

Report date	By the year 2000				By the year 2020			
	"No-new-orders" case	Low case	Middle case	High case	"No-new-orders" case	Low case	Middle case	High case
August 1980[A]	([B])	59,587	64,628	69,593	([B])	150,393	167,074	203,982
May 1982[C]	([B])	50,110	54,133	57,392	([B])	160,332	184,138	136,939
February 1983[D]	45,600	45,600	48,200	49,800	84,500	108,300	132,600	156,800
November 1984[E]	46,400	46,800	49,000	50,200	97,700	111,000	130,300	154,500
December 1985[F]	39,861	39,864	41,658	42,159	74,635	87,397	106,404	126,192
September 1986[G]	40,800	40,800[H]	41,600[I]	42,000[J]	79,300	86,800[H]	106,000[I]	130,300[J]

[A] Domestic Nuclear Fuel Cycle Requirements Associated with the Nuclear Power Forecasts of the Energy Information Administration, SR/ES/80-08.
[B] Not included.
[C] Draft (based on 1981 EIA Report to the Congress).
[D] World Nuclear Fuel Cycle Requirements--1983, DOE/EIA-0436, 1983.
[E] World Nuclear Fuel Cycle Requirements--1984, DOE/EIA-0436, 1984.
[F] World Nuclear Fuel Cycle Requirements--1985, DOE/EIA-0436, 1985.
[G] World Nuclear Fuel Cycle Requirements--1986, DOE/EIA-0436, 1986.
[H] Referred to as the "lower reference case" in the 1986 EIA report.
[I] Referred to as the"upper reference case" in the 1986 EIA report.
[J] Referred to as the "optimistic" case in the 1986 EIA report.

Another reason for decreasing forecasts is the increasing level of nuclear fuel "burnup," which is defined as the amount of energy produced per unit weight of fuel. To increase cost efficiency, the nuclear utility companies have been gradually increasing the burnup levels. For example, in the early days of commercial nuclear power, the average burnup was about 20,000 megawatt-days per metric ton of uranium (MWd/MTU), whereas the current levels are in the range of 30,000 to 35,000 MWd/MTU. When an industry survey, conducted at the request of the Office of Civilian Radioactive Waste Management, indicated that burnup levels of 35,000 to 45,000 MWd/MTU may be common in the industry, the EIA, in consultation with industry representatives, decided in 1985 to adopt extended burnup as a key assumption in estimating spent-fuel discharges. The 1985 EIA report is thus based on the assumption that burnup levels will gradually increase, exceeding current levels by 30 percent in 1993, and then stay constant. This accounts for most of the large decrease from the 1984 EIA projections in the spent-fuel discharges predicted for the years after 2000 in the 1985 estimates (see Table E-1). For the cases in the 1986 report, the EIA assumed a 30-percent increase in burnup by 1998 and a constant level thereafter. (In addition, the assumed reactor lifetimes were longer than those in the 1985 report, assumptions on nuclear capacity and generation were changed, and a shorter average fuel cycle was assumed, creating a slight increase in spent-fuel discharges in some of the cases.) The effect of increasing burnup can be seen more clearly from the EIA sensitivity cases. In the 1985 report, an assumption of no increase in burnup results in a forecast of 126,642 MTU for the year 2020 (close to the 1984 estimate), whereas an assumption of a 50-percent increase in burnup yields only 101,138 MTU.

The reduced quantities of spent fuel projected by assumptions of higher burnups would, however, consist of fuel that generates more heat per assembly. Thus, potential cost savings due to handling smaller numbers of spent-fuel containers would be offset by the need to provide greater spacing between packages of spent fuel in the repository. Furthermore, the underground area required for the repository, determined by the heat output of the total waste inventory, may not be appreciably altered by higher-burnup fuel.

E.4 UNCERTAINTIES

Although forecasts like those shown in Table E-1 are useful for planning purposes, it must be recognized that substantial uncertainties are involved in predicting the amount of spent fuel that will be discharged from nuclear power plants. Furthermore, the uncertainty increases with time. For example, the extremes of the 1986 EIA forecasts of spent fuel accumulated by the year 2000 show a difference of only 1200 MTU, which is less than 3 percent of the forecast for the upper reference case. However, the forecasts for the year 2020 cover a range of 51,000 MTU, which represents nearly 50 percent of the value for the upper reference case. Thus, less confidence can be placed in the accuracy of predictions past the year 2000. Nonetheless, it is highly likely that the volume of spent fuel requiring disposal will be significantly less than that expected when the Act was passed in 1982 or when the Mission Plan was issued in 1985.

Appendix F

WASTE-ACCEPTANCE SCHEDULE

F.1 INTRODUCTION

The 1985 Mission Plan presented representative waste-acceptance schedules for the authorized system and the improved-performance system.[1] Because of the decision to postpone indefinitely site-specific activities for the second repository, the rebaselined schedule for the first repository, and the revised estimate of when an MRS facility could begin receiving waste, it was necessary to develop a revised waste-acceptance schedule as a reference for planning purposes and for fee-adequacy assessments.

Like the schedule in the 1985 Mission Plan, the schedule presented here is only an approximation of how the system may operate and is subject to considerable variation. The DOE will further define and specify the system operating and waste-acceptance parameters as the program progresses. The DOE will use the forecasts made by the DOE's Energy Information Administration (EIA) of gross electricity generation by nuclear power plants and the attendant spent-fuel discharges as the planning basis for the overall waste-management program. The DOE will consider other forecasts of nuclear power growth as conditions warrant. The waste-acceptance schedule will serve as a planning base that will be updated annually in response to the latest forecasts of nuclear power growth.

Under the terms of the contract[2] that has been signed between the DOE and the owners and generators of spent fuel and high-level waste, an annual capacity report with projected annual receiving capacities and rankings will be issued by the DOE for planning purposes beginning in 1987. In 1991, the DOE is required to begin publishing annual acceptance priority rankings for spent-fuel receipt by the DOE. Beginning January 1, 1992, the utilities are to submit to the DOE for approval delivery commitment schedules based on these rankings. These schedules will form the basis for final delivery schedules to be submitted by the utilities not less than 12 months before the actual delivery dates.

The above-mentioned contract provides for the DOE's acquisition of title to spent nuclear fuel and high-level waste, transportation, and subsequent disposal. Under the contract, these services are to be provided "after commencement of facility operations, not later than January 31, 1998." Table F-1 shows an illustrative schedule that is consistent with that requirement and reflects the DOE's current plans for the development of the improved-performance waste-management system.

Table F-1. Illustrative waste-acceptance schedule
(All quantities in metric tons of uranium)

Year	MRS facility			First repository		Second repository		Total system acceptance	
	Spent fuel received	In storage	Spent fuel shipped	Spent fuel	HLW	Spent fuel	HLW	Spent fuel	HLW and spent fuel
1998	1200	1200						1200	1200
1999	1200	2400						1200	1200
2000	1200	3600						1200	1200
2001	1200	4800						1200	1200
2002	1200	6000						1200	1200
2003	2000	7600	400	400				2000	2000
2004	2650	9850	400	400				2650	2650
2005	2650	12100	400	400				2650	2650
2006	2650	13850	900	900				2650	2650
2007	2650	14700[A]	1800	1800				2650	2650
2008	2650	14700	2650	3000[B]	400			3000	3400
2009	2650	14700	2650	3000	400			3000	3400
2010	2650	14700	2650	3000	400			3000	3400
2011	2650	14700	2650	3000	400			3000	3400
2012	2650	14700	2650	3000	400			3000	3400
2013	2650	14700	2650	3000	400			3000	3400
2014	2650	14700	2650	3000	400			3000	3400
2015	2650	14700	2650	3000	400			3000	3400
2016	2650	14700	2650	3000	400			3000	3400
2017	2650	14700	2650	3000	400			3000	3400
2018	2650	14700	2650	3000	400			3000	3400
2019	2650	14700	2650	3000	240			3000	3240
2020	2650	14700	2650	3000				3000	3000
2021	2650	14700	2650	3000				3000	3000
2022	2650	14700	2650	3000				3000	3000
2023	1410	13460	2650	3000		900		2660	2660
2024		10460	3000	3000		1800		1800	1800
2025		7460	3000	3000		3000	400	3000	3400
2026		4460	3000	3000		3000	400	3000	3400
2027		1460	3000	3000		3000	400	3000	3400
2028		0	1460	1460		3000	400	3000	3400
2029						3000	400	3000	3400
2030						3000	400	3000	3400
2031						3000	400	3000	3400
2032						3000	400	3000	3400
2033						3000	400	3000	3400
2034						3000	400	3000	3400
2035						3000		3000	3000
2036						3000		3000	3000
2037						1940		1940	1940
2038									
Total	59,760		59,760	65,360	4640	40,640	4000	106,000	114,640

[A] Maximum quantity stored at the MRS facility is 14,700 MTU.

[B] In years when the repository acceptance does not match MRS facility shipments, the difference is attributable to shipments from nearby reactors directly to the repository.

F.2 KEY CHANGES IN THE WASTE-ACCEPTANCE SCHEDULE

The key changes in Table F-1 from the corresponding table in the 1985 Mission Plan (Table 2-3) are as follows:

1. Acceptance of spent fuel begins at the MRS facility in 1998. The MRS facility is shown as starting operations in 1998 rather than 1996, consistent with the revised estimate for the start of MRS operations (linked to the receipt from the Nuclear Regulatory Commission of a construction authorization for the first repository) as described in this document.

2. The first repository is shown as starting operations in 2003 rather than 1998, consistent with the revised schedule for the first repository described in Appendix B.

3. The second repository is shown as starting operations after 2020 rather than 2006. This revised date is only an approximation for reference; it does not represent a firm schedule for the second repository. Since no more than 70,000 metric tons of uranium (MTU) can be emplaced in the first repository before a second repository is in operation, the first-repository schedule indicates that the second repository needs to begin operations by the year 2028. The illustrated earlier date of 2023 was selected on the grounds that it would be desirable to have a fairly uniform and continuous rate of spent-fuel acceptance into the system. The actual schedule of the second repository will depend on the actual rates of spent-fuel generation, the acceptance rates of the first repository, and the time that will be needed to develop the second repository.

4. The projected total quantity of spent fuel generated through the year 2020 has decreased from 130,300 to 106,000 MTU. The new forecast is based on the upper reference case (i.e., increasing nuclear fuel burnup--see Appendix E) in the EIA report World Nuclear Fuel Cycle Requirements--1986[3]).

5. The illustrated receipt rates of the MRS facility have been revised, with a full-scale rate of 2650 MTU per year rather than 3000 MTU and a different startup schedule. The spent-fuel acceptance rate for the total system remains at 3000 MTU per year, but Table F-1 assumes that 350 MTU of spent fuel from nearby reactors would be received directly by the repository and 2650 MTU would be received and shipped by the MRS facility. With the increased period of time between the start of MRS and repository operations, the indicated inventory of spent fuel in storage at the MRS facility has increased from 13,300 to 14,700 MTU. This amount is smaller than the 15,000-MTU limit proposed by the DOE for the MRS facility.

6. The quantity of high-level waste has been increased by 640 MTU, and 4000 MTU of high-level waste has been assigned to the second repository. The 1985 Mission Plan assumed that the estimates of 8000 MTU of high-level waste included commercial high-level waste from the West Valley Demonstration Project. Table F-1 considers the West

Valley waste (equivalent to 640 MTU) to be additional to 8000 MTU of defense high-level waste. The assumption of an equal amount of defense high-level waste for each repository is consistent with the assumptions made for sample calculations for the proposed method for calculating disposal fees for defense high-level waste. All 640 MTU of the commercial high-level waste was assumed to be received by the first repository.

With the 5-year extension of the date for the start of operations at the first repository, the date for beginning to accept high-level waste is 5 years later than the date shown in the 1985 Mission Plan (Table 2-3). The DOE will make arrangements to store defense high-level waste until it can be accepted at the repository.

7. The total quantity of spent fuel received by the second repository is shown as 40,640 MTU rather than 68,300 MTU. This is a consequence of the new, lower EIA spent-fuel forecasts.

The revised waste-acceptance schedule in Table F-1 represents the DOE's current baseline assumptions for fee-adequacy assessments and for other studies of the waste-management system. However, this schedule is based on a budget requirement of $725 million for fiscal year 1988 (a budget amendment is being prepared for submittal to the Congress) and the timely completion of several key milestones. These include the approval of the MRS facility by the Congress, the start of operations at the MRS facility, the receipt from the Nuclear Regulatory Commission of a construction authorization for the first repository, and the start of operations at the first repository.

F.3 CONTINGENCY PLANS

If the Congress does not approve the MRS facility, the transfer of the waste to DOE facilities may not be able to begin in 1998. The DOE will continue to encourage and expedite the effective use of available storage and the development of necessary additional storage at reactor sites.

If the Congress approves the MRS facility, but it is not possible to begin MRS operations by 1998 because of longer design, licensing, or construction times, then the impacts on the utilities would be similar but the extent of mitigating actions would be less. A similar situation would occur if the MRS facility is available for spent-fuel acceptance on time, but the construction authorization for the repository is delayed beyond 1998, because the DOE will recommend that the Congress specify that the MRS facility cannot start receiving spent fuel until a construction authorization for the repository is received.

Should the MRS facility be available in 1998 and the construction authorization for the repository be received on time, the waste-acceptance schedule may still need to be revised if the repository does not begin operations by 2003. In that event, the MRS receipt rates may need to be reduced to prevent the MRS inventory from exceeding 15,000 MTU.

REFERENCES

1. U.S. Department of Energy, Mission Plan for the Civilian Radioactive Waste Management Program, DOE-RW-0005, Washington, D.C., 1985, Vol. I, Part I, Chapter 2.

2. U.S. Department of Energy, "Standard Contract for Disposal of Spent Nuclear Fuel and/or High-Level Radioactive Waste," Federal Register, Vol. 48, No. 75, p. 16590, April 18, 1983.

3. U.S. Department of Energy, World Nuclear Fuel Cycle Requirements--1986, DOE/EIA-0436(86), Energy Information Administration, Washington, D.C., 1986.

Secretary HERRINGTON. Today I want to give a brief status report on the waste program and then focus on substantive issues which I believe are the main interests of the Committee and which are addressed in the Mission Plan amendment. Last May I nominated five sites and recommended to the President three of those sites for characterization as candidates for the first repository. The three sites are Yucca Mountain in Nevada, Deaf Smith in Texas, and the Hanford site in the State of Washington.

The President approved my recommendation. With the President's approval of the three sites to characterize, site chracterization began. Site characterization will take five to seven years, depending on the site. Although we had planned to begin with exploratory shaft construction at one or two of the sites in this fiscal year, Congress in the appropriation for the waste program for Fiscal Year 1987 specified that no funds are to be used for drilling any exploratory shaft at any site in Fiscal Year 1987. However, Congress did allow for site specific work other than exploratory shaft drilling to be conducted at reduced funding levels, and we are proceeding with the allowable characterization activities.

Following the announcement of the President's approval of the three sites for characterization for the first repository, I announced that, based on the progress in selecting the first repository and other factors, DOE had reassessed the timing of the Department's activities towards identification of candidates for a second repository. I announced that DOE had decided to postpone indefinitely plans for any site-specific work related to a second repository. Instead, we are focusing on generic technical issues and analyses and a continuation of current programs of international cooperation. We continue to believe that a Monitored Retrievable Storage facility—that is, the MRS facility, must be an integral part of the waste management system.

Although legally enjoined from submitting the proposal to Congress, we stand ready to submit that proposal for consideration as soon as the court permits us to do so. Significant progress has been made regarding transportation, another integral part of the waste disposal system. The Department of Energy has issued both a Transportation Business Plan and a Transportation Institutional Plan. There have been many other achievements to date in the program, but I would like to now focus on the main points discussed in the draft Mission Plan amendment, which I believe are the principal policy issues of interest to this Committee.

Number One, the issue of indefinite postponement of site specific work for a second repository. Issue Number Two, extension of the date contemplated for startup operation of the first repository from January 31st, 1998, to 2003 to allow time to carry out the necessary high quality technical program. Issue Three, inability to submit the Monitored Retrievable Storage proposal required by Section 141 of the NWPA to Congress because of litigation. Issue Four, interactions with the States, affected Indian Tribes, and the public.

The experience gained in achieving the important milestone of approval of sites for characterization and advances in the technical planning of the program have led us to reassess the program and schedule for the first repository. The new schedule as presented in this draft Mission Plan amendment shows a five-year extension of the date for the waste acceptance at the first repository from 1998 to 2003. The table attached to my statement shows the current schedule as compared to the schedule contained in the 1985 mission plan.

There are several reasons for this extension. Among them are, Number One, the recognition that more time should be provided in the future for consultation and interaction with the States, the affected Indian Tribes, and other parties, and Number Two, the recognition that more technical information is needed.

Since passage of the NWPA, it has been pointed out on many occasions that the schedule and the siting process simply are not reconcilable, that to achieve one it would be necessary to sacrifice the other. DOE has attempted to meet both objectives and developed an aggressive schedule that would have permitted the first repository to begin accepting waste in January 1998.

At the same time, Mr. Rusche and I have been insistent that the schedule would not be allowed to prevail at the expense of technical excellence and public participation. We now recognize that more information, more consultation, and more time is required in the near term to ensure public confidence in the development of the first repository for long-term permanent disposal.

We realize that for many early actions we underestimated the time required. Furthermore, DOE recognizes the potential for contingencies that are yet to appear. The five-year extension for start-up operations for the first repository, therefore, requires a reevaluation of the waste acceptance strategy. Based on this reevaluation we believe that the most advantageous course is the development of an MRS.

As presented in the draft amendment that we have submitted, DOE believes that it can meet the 1998 commitment through the development of an MRS system. With an MRS capable of receiving wastes in 1998, we can meet the contractual obligation with nuclear generating utilities to begin receiving waste in 1998. We are, therefore, hopeful that the legal impediment will be removed shortly and that we will be permitted to submit the MRS proposal to Congress for consideration.

With regard to the indefinite postponement of the site specific activities for a second repository, my decision last May was based on a number of factors including declining projections of the rates at which spent fuel will be discharged from commercial nuclear power plants, and that is the most important.

We have not abandoned a second repository. In fact, even the lowest current projections of spent fuel generation indicate that a second repository will be needed. DOE, therefore, remains fully committed to a two repository system. Under the revised schedule for the first repository, the statutory limit of 70,000 metric tons would be reached some time after the year 2025 if the annual rate of waste emplacement is 3,000 metric tons per year. The actual schedule for the second repository, however, is yet to be determined.

It will depend on more refined estimates of spent fuel generation rates, the time needed for the first repository to reach the limit of 70,000 metric tons, and the time needed to develop the second repository. The experience of siting the first repository suggests that site specific screening leading to the identification of potentially acceptable sites should start about 25 years before the start of waste acceptance for disposal.

Therefore, to have the second repository available by the year 2025 site specific studies need not start until the middle to late 1990s.

Another important issue is interaction with States and affected Indian Tribes and the public. The NWPA requires DOE to seek to enter into and negotiate written Consultation and Cooperation agreements with States and affected Indian Tribes after approval of candidate sites for characterization or earlier if an eligible State or Indian Tribe requests. Some formal as well as informal negotiations have occurred, but as of yet no C&C agreements have been concluded. We plan to increase our efforts to improve productive institutional relations and to negotiate formal C&C agreements. In this regard, we are continuing a number of new initiatives to encourage these negotiations. For example, preliminary or partial agreements or memoranda of understanding might be useful.

In conclusion, we sincerely hope that the amendment to the Mission Plan will provide a suitable vehicle for Congress to provide any statutory direction it believes is needed for conduct of the program.

This concludes my remarks, Mr. Chairman. I would like to add one personal observation. This is not an easy program both for Congress and for the Department of Energy. I consider myself in a position similar to an executive officer of a corporation who has made managerial decisions to keep an ongoing program viable and moving to completion. I am in front of the board of directors now asking for your input, your guidance, your advice. This is my best estimate on how this program can be carried out. It has been put in a draft Mission Plan amendment and is being submitted to Congress, and I hope the Congress will respond to this and tell us, yes, we are on the right track, or no, we are not doing it right.

One thing must be absolutely clear. We intend to carry out the intent of this law as it is written and as Congress wants us to. There is no intention by this Department, myself, or Mr. Rusche, to freelance in this important program. This is what we think makes sense, and we hope that Congress will guide us in our carrying out of the program.

Thank you, sir.

[The prepared statement of Secretary Herrington follows:]

STATEMENT BY

JOHN S. HERRINGTON
SECRETARY OF ENERGY

before the

COMMITTEE ON ENERGY AND NATURAL RESOURCES
UNITED STATES SENATE

JANUARY 29, 1987

Mr. Chairman and Members of the Committee:

I appreciate the opportunity to appear before you today to review policy issues of interest to the Committee regarding the program being carried out under the Nuclear Waste Policy Act of 1982 (the NWPA). With me is Ben C. Rusche, my Director of the Office of Civilian Radioactive Waste Management.

We have prepared a draft amendment to the Mission Plan for the Civilian Radioactive Waste Management Program. In that document, which we are sending to States and affected Indian Tribes, the Nuclear Regulatory Commission and other Federal agencies for comment -- and will make available for public inspection -- we discuss significant developments and new information in the waste program.

The Mission Plan is intended to keep Congress fully informed on progress in the program and the amendment will ensure that the Plan reflects current program status. After a 60-day comment period, DOE will revise the amendment in response to the comments as appropriate and will submit it formally to Congress for information and direction. We would expect this to occur in about 120 days from now. With your permission, Mr. Chairman, I would like at this time to submit a copy of the draft amendment for the record.

Today, I would like to give a brief status of the waste program and then focus on the substantive issues which I believe are of main interest to the Committee and which are addressed in the Mission Plan amendment.

Last May, I nominated five sites in Mississippi, Nevada, Texas, Utah and Washington as suitable for characterization and recommended to the President three of those sites for characterization as candidates for the first repository. The three sites are: the Yucca Mountain site in Nevada, the Deaf Smith County site in Texas and the Hanford site in Washington. The President approved my recommendation.

With the President's approval of the three sites to characterize, we have finally passed beyond the crucial decision of where to focus our repository siting efforts and that action formally marked the beginning of site characterization.

Site characterization will take five-to-seven years, depending on the site.

Although we had planned to begin exploratory shaft construction at one or two of the sites this fiscal year, Congress, in the appropriation for the waste program for Fiscal Year 1987, specified that no funds are to be used for drilling any exploratory shaft at any site in FY 1987. However, Congress did allow for site-specific work, other than exploratory shaft drilling, to be conducted at reduced funding levels; and we are proceeding with other allowable characterization activities.

Following the announcement of the President's approval of three sites for characterization as candidates for the first repository, I announced that based on the progress in selecting the first repository and other factors, DOE had reassessed the timing of the Department's activities toward identification of candidates for a second repository. I announced that DOE had decided to postpone indefinitely plans for any site-specific work related to a second repository.

We have not abandoned a second repository; we are continuing studies for a second repository, as required by the NWPA. Those studies are focusing on generic technical issues and analyses and a continuation of the current program of international cooperation.

We continue to believe that a Monitored Retrievable Storage (MRS) Facility should be an integral part of the waste management system. Although legally enjoined from submitting the proposal to Congress, we stand ready to submit it for consideration as soon as permitted.

As stated more than a year ago in review copies of a proposal we made available, we believe that an MRS centrally located to the majority of the spent fuel generated would enhance the disposal system by receiving and consolidating the spent fuel prior to shipping to the repository. DOE's intent regarding MRS is to fulfill its statutory obligations under the NWPA and to submit the proposal on MRS to Congress at the earliest date practicable.

Significant progress has been made regarding transportation -- another integral part of the waste disposal system. DOE has issued both a Transportation Business Plan and a Transportation Institutional Plan. The Business Plan presents strategies for procuring shipping casks and support services, and the Institutional Plan lays the foundation for interactions among interested parties for resolution of transportation issues. In addition, we have issued a request for proposals for design and engineering of shipping casks and fabrication of prototypes.

There have been many other achievements to date in the program, but instead of further discussion of those, I would like now to focus on the main points discussed in the draft Mission Plan amendment and which I believe are the principal policy issues of interest to the Committee:

1. Indefinite postponement of site-specific work for a second repository.
2. Extension of the date contemplated for start-up

operation of the first repository from January 31, 1998, to 2003 to allow time to carry out the necessary high-quality technical program.

3. Inability to submit the Monitored Retrievable Storage (MRS) proposal to Congress required by Section 141 of the NWPA because of litigation. And,
4. Interactions with States, affected Indian Tribes, and the public.

The experience gained in achieving the important milestone of approval of sites for characterization, and advances in the technical planning of the program, have led us to reassess the program and schedule for the first repository. The new schedule -- as presented in the draft Mission Plan amendment -- shows a 5-year extension of the date for the waste acceptance at the first repository, from 1998 to 2003. The table attached to my statement shows the current schedule as compared to the schedule contained in the 1985 Mission Plan.

There are several reasons for the near-term extension. Among them are:

- The recognition that more time should be provided in the future for consultation and interaction with the States, affected Indian Tribes, and other parties; and,

- The recognition that more technical information is needed.

Since passage of the NWPA, many parties have insisted that, given the controversial nature of the program, the schedule specified in the Act was not realistic and not achievable. It has been pointed out on many occasions that the schedule and the siting process are not reconcilable -- that to achieve one, it would be necessary to sacrifice the other.

DOE has attempted to meet both objectives and developed an aggressive schedule that would have permitted the first repository to begin accepting waste in January 1998. At the same time, Mr. Rusche and I have insisted that the schedule would not be allowed to prevail at the expense of technical excellence and public participation.

We now recognize that more information, more consultation and more time is required in the near-term to ensure public confidence in and development of the first repository for long-term (permanent) disposal. We will remain optimistic in our planning, but realize that for many early actions, we underestimated the time required. Furthermore, DOE recognizes the potential for contingencies that are yet to appear.

The 5-year extension for start-up operations at the first repository, therefore, requires a reevaluation of the waste acceptance strategy. Based on a reevaluation, we believe that the most advantageous course is the development of an MRS. And as presented in the draft amendment, DOE believes it can meet the 1998 commitment through the development of an MRS facility.

With an MRS capable of receiving waste in 1998, we can meet the contractual obligation with nuclear-generating utilities to begin receiving waste in 1998.

We are, therefore, hopeful that the legal impediment will be removed shortly and that we will be permitted to submit the MRS proposal to Congress for consideration.

With regard to the indefinite postponement of site-specific activities for a second repository, my decision last May was based on a number of factors, including declining projections of the rates at which spent fuel will be discharged from commercial nuclear powerplants; progress in siting the first repository and confidence in finding suitable sites among the three sites approved by the President for characterization; the advantages to be gained from the experience of the first repository; the expectation of Congressional approval for the MRS facility; and, responsible fiscal management.

I would like to point out, again, that we have not abandoned a second repository. In fact, even the lowest current projections of spent fuel generation indicate that the second repository will be needed. DOE, therefore, remains fully committed to a two-repository system.

The specific requirement related to the second repository is stated in the NWPA in terms of the maximum amount of spent fuel that the Nuclear Regulatory Commission can allow to be emplaced in the first repository until a second repository is in operation. The NWPA sets this figure at 70,000 metric tons of uranium.

Under the revised schedule for the first repository, this limit would be reached sometime after the year 2025 if the annual rate of waste emplacement is 3,000 metric tons. The actual schedule for the second repository, however, is yet to be determined; it will depend on more-refined estimates of spent fuel generation rates, the time needed for the first repository to reach the limit of 70,000 metric tons and the time needed to develop the second repository.

The experience of siting the first repository suggests that site-specific screening leading to the identification of potentially acceptable sites should start about 25 years before the start of waste acceptance for disposal. Therefore, to have the second repository available by about 2025, site specific studies need not start until the middle to late 1990s.

Another important issue is interaction with States and affected Indian Tribes and the public. The NWPA requires DOE to seek to enter into and negotiate written Consultation and Cooperation (C&C) agreements with States and affected Indian Tribes after approval of candidate sites for characterization, or earlier, if an eligible State or Indian Tribe requests. Some formal as well as informal negotiations have occurred, but as yet no formal C&C agreements have been concluded.

Given the nature of the program and the reality that the perspectives of the States and affected Indian Tribes often differ from DOE's, we recognize that formal agreements may not be easy to reach. But we also recognize that the success of the waste-management program may depend largely on the success of institutional relations as well as interactions with the public.

We plan to increase our efforts to improve productive institutional relations and to negotiate formal C&C agreements. In this regard, we are considering a number of new initiatives to encourage these negotiations. For example, preliminary or partial agreements or memoranda of understanding might be useful.

Conclusion

In conclusion, DOE has adopted the principle that its schedule would not be pursued at the expense of consultation and interaction with affected States and Indian Tribes and the public.

The revised schedule for both the first repository and site specific activities for a second repository allows more time for interactions with affected and interested parties and for acquiring additional information necessary to successfully develop the waste disposal system.

Furthermore, we sincerely hope that the amendment to the Mission Plan will provide a suitable vehicle for Congress to provide any statutory direction it believes is needed for our conduct of the program.

Mr. Chairman, this concludes my remarks. I would be happy to respond to any questions you may have and, with your permission, I may call on Mr. Rusche for more details.

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Schedule for the first repository [a,b]

Milestone	Current schedule	1985 Mission Plan schedule
Start of exploratory-shaft construction		
Tuff	Second quarter 1988	Third quarter 1986
Basalt	Third quarter 1988	Third quarter 1986
Salt	Fourth quarter 1989	Third quarter 1987
Start of in-situ testing		
Tuff	Fourth quarter 1989	Third quarter 1988
Basalt	First quarter 1992	Fourth quarter 1988
Salt	Fourth quarter 1991	Second quarter 1989
End of site characterization[c]		
Tuff	First quarter 1992	Third quarter 1989
Basalt	First quarter 1993	Third quarter 1989
Salt	First quarter 1993	Third quarter 1989
Draft environmental impact statement	Fourth quarter 1993	Third quarter 1990
Final environmental impact statement	Fourth quarter 1994	Fourth quarter 1990
Submittal of the site-selection report to the President	Fourth quarter 1994	First quarter 1991
Submittal of the license application to the Nuclear Regulatory Commission	First quarter 1995	Second quarter 1991
Receipt of a construction authorization from the Nuclear Regulatory Commission	First quarter 1998	Third quarter 1993
Start of construction	First quarter 1998	Third quarter 1993
Start of phase 1 operations	First quarter 2003	First quarter 1998
Start of phase 2 operations	Second quarter 2006	First quarter 2001

[a] The schedule is given in calendar-year quarters.

[b] This schedule is based on a budget requirement of $725 million for fiscal year 1988.

[c] End of the testing necessary for the selection of the repository site and the preparation of the draft environmental impact statement.

The CHAIRMAN. Thank you very much, Mr. Secretary. As I have said many times and I want to repeat here, it is a very difficult program, very hard to implement, and we must make sure that politics is removed from this issue completely and that the appearance of politics be removed from the issue. Because to the extent that the program looks political, then everyone loses confidence in it. It becomes a political battleground. We have here a very highly important national priority which must be done fairly, legally, in accordance with the Act, expeditiously, and in a way that offends as little as possible. I think it is possible to offend not too much when the real facts about what the Act requires are brought out, so I want to emphasize that about the politics of this matter.

Secondly, in your letter to the Congress three issues have emerged which you say "warrant Congressional attention. The three issues are indefinite postponement of site specific work on the second or eastern repository, extension of the date for opening the first respository from 1998 to 2003, and inability to submit the MRS proposal to Congress as required by the Nuclear Waste Policy Act because of litigation.

The key question is: Is the administration asking Congress to amend the Act to address these issues?

Secretary HERRINGTON. Mr. Chairman, I do not feel an amendment to the Act is necessary, and I do not think we should in good conscience open up the Act for amendment or a revisiting. Congress can endorse this draft Mission Plan amendment in two ways. Congress can step up and say, we think the Department of Energy is on the right course. We like the draft Mission Plan amendment. Or you can support us through the appropriation process because a budget has been submitted based on this draft Mission Plan amendment. Either way, we would take it as a sign that Congress thinks we are doing a good job on this.

I, too, Mr. Chairman, must say politics have no place in this program or the decisions in it and they have not entered any decisions I have made. I have been criticized by members of my own party for these decisions. The President approved one of the sites in a State where one of his very best friends was a Senator. I just do not believe the political argument is viable.

What we are trying to do is manage a difficult program in a businesslike way, and that is going to continue during the next two years, and I am in charge of it. We will be responsive to this Committee and to Congress.

The CHAIRMAN. Well, I would submit that the indefinite postponement of site specific work on the second repository and the extension of the date for the first repository would require legislation and that the Act clearly requires both. Mr. Secretary, would you describe for us how the program is going right now, and where you would like it to go under the amended mission plan?

Secretary HERRINGTON. I could make some general comments, Mr. Chairman. I think most of it is in the draft Mission Plan amendment which I think is very detailed. In this program, we have encountered, obviously, tremendous opposition. You can say two things about this program that are absolutely true. We desperately need a nuclear waste repository in this country. We cannot have nuclear waste sitting around in pools of water around America's utilities. Number Two, nobody wants it. Both of those are true.

We have the technical basis in this country. We have the scientific basis, and we have the people to develop a safe repository, one that is environmentally sensitive, and a transportation system that can go with it. I think that we are learning as this process progresses that we need to have better communication with States, and with local jurisdictions. We need to work closer with them and be more responsive to them. That is going to take more time, and that is part of the slippage of five years.

The CHAIRMAN. One comment and one quick question, and then I will open it up. We have had conversations in the past about the so-called benefits package. It is very clear that the State which finally gets both the repository and the MRS are going to have a lot of benefits, but those benefits have never been detailed, unless they are clearly stated in the mission plan. There has never been detail of what a State can expect. When will that be set forth with more specificity, because, frankly, all the States, at least some of the States, worry that these vague promises about the benefits may evaporate once they get the repository or the MRS.

Secretary HERRINGTON. I think that decision, Mr. Chairman, is in the future. I think it would be a mistake to start dealing out benefits to waste repository sites at this stage of the proceedings before we know which site is viable. We have put in the draft Mission Plan amendment at Page 14, third paragraph from the bottom, a paragraph that deals with what Congress may want to consider in additional financial assistance. This program is a very generous program for States and local communities that may get the waste site either during characterization or during final siting. It is a good program.

I frankly am surprised that some State has not stepped up and said here are 2,500 to 3,500 jobs, a chance to finance our educational system, a good, viable industry for our State, and said, we would like to investigate the possibility of taking this. I would expect some time in the process for something like that to happen.

This is a good program, and it is technically sound.

The CHAIRMAN. Finally, Mr. Secretary, we provided for characterization of the three sites and at the time the cost estimates were about $60 million per site. Now we are advised that it will be about $1 billion per site. Are you absolutely convinced that characterization at $1 billion per site is essential or is there a way to choose one of those sites without characterizing all three sites which would give us another couple of billion, a large amount of which could go into a benefits package?

Secretary HERRINGTON. A lot of input we have had in this particular program has asked us if we would not like to characterize five sites, and we have resisted that and limited it to three. All of them are different. There is a salt structure, there is a tuff structure and a basalt structure. They are all different. They are all unique. And they are all designed to decide which one environmentally and on a technical basis will be the best. If the program needs to be in place by the year 2000, I would hesitate against limiting us to one site. It might not work. We need some diversity in this.

On the costs, I have reviewed them with Director Rusche. I think he could answer in more detail on how the cost estimates got to $1 billion per site if the Chairman would like.

The CHAIRMAN. Before these hearings are over I would like to do that, because I think that is a very keen, critical question. And there are a series of voices being raised that we ought to try to choose a site without characterizing all three, but we will get into that later.

Senator McClure?

Senator MCCLURE. Thank you, Mr. Chairman. I appreciate the opening comments that the Chairman has made and I do not disagree at all that this program must be administered in such a way that it has not only the appearance but the reality, or, turn that around, not only the reality but the appearance that it has not been manipulated for partisan political purpose, and I think that is what the Senator intended to say.

I do not think any of us believes it is not a political process. However, I suspect one of our guests here this morning, Senator Adams from the State of Washington, would be one of those who says it is a highly political issue. That may be one of the reasons he is here this morning. So I do not think we can, no matter how we would like to address this, divorce ourselves from the political process you are involved in in testifying here. But I want to underscore both what the Chairman said and what I said in my opening remarks. I side I believe the statute sets forth certain guidelines and certain dates and certain activities that must be undertaken, and that if indeed the statute is not amended you must in good faith undertake them.

I do not quite understand how you can divorce yourself from the requirement of the statute to undertake a site selection process for a second repository and say, but we are going to postpone indefinitely any consideration of it, without erecting the immediate public reaction that the steps taken with respect to the second repository required by the statute are only a political exercise and not a real technical exercise.

One of the reasons for the requirement of the second site, as I am sure you are aware, but perhaps requires some repetition, the requirement for a second repository is so you can say with good faith and with credibility to the State of the first repository you are not going to have all there is ever generated in the United States. Now the time frame is very, very difficult here, because if we wait another ten years before we even begin the process of characterization of the second repository how in the world do we expect to be able to say to the State that has the first repository you can expect there will be a second repository?

I know that has been already. It is going to be said again. I think the State of Tennessee, which happens to be the recommended site for the MRS, has had some assurances too that we are really serious about both the first and the second, and that the MRS is not the only one that we are going to end up having. I welcome your suggestion here today that the administration is committed to the necessity of a second repository, and I commend to you the desirability of a timetable and an activity schedule that gives reality to a second repository.

Mr. Secretary, do you have any comment or any way in which you can extend to the first repository State and the MRS repository State, wherever that may ultimately be, that indeed the process will predictably and dependably yield a first repository, a second respository, and an MRS which is the stated policy of the Congress?

Secretary HERRINGTON. Senator McClure, I could not agree more with what you have said, and I want to be very clear that we are committed to a second repository. In this plan that issue is set forward. What I have said in the draft Mission Plan amendment is, I do not think you have to decide today where that second repository is going to be. Two reasons. One, are we going to have the amount of waste that we think we are going to have in the time frame of 2025? Will the NRC allow plants to open? Will plants shut down? Will we move to more of a policy based on coal or some other type fuel?

We do not have to make that decision today. You can make it in 1995 and still have 25 years to have your repository ready, but that does not lessen our commitment to it. Number Two, there is a small matter of between $700 million and $900 million being spent on that second repository. I do not think you have to spend it now when you may not have to spend it until 1995. I think that is good business planning myself.

Now, if Congress, the board of directors for this company that is trying to manage this program, says, Mr. Herrington, that is not correct, when we said get a second repository we meant get it and get it now, then we are going back to it and get it.

Senator McCLURE. Thank you very much for your statement. I have a number of other questions but I will submit them for response in writing.

Thank you, Mr. Chairman.

The CHAIRMAN. Senator Domenici.

Senator DOMENICI. I do not think I was here next if you are following the first arrival, but I am pleased to go if nobody objects.

The CHAIRMAN. Since we do not have an order we are calling on you.

Senator DOMENICI. Great.

Mr. Secretary, let me just tell you, I know you have got a terrible problem, and I think this mission plan probably is a very good faith effort, and probably your analogy that you are the CEO is a neat idea, but the truth of the matter is that a group of Senators from both sides of the aisle, a group of Congressmen for years fought over a statute.

I think it is fair to say that most of us do not think lame duck sessions are ever good for anything. Is that a fair statement, Mr. Chairman?

The CHAIRMAN. Yes.

Senator DOMENICI. But I think there was a huge sigh of relief because the only lame duck I have participated in got this bill. Is that not right? We did it in a lame duck session, and you really cannot throw it away, I am afraid. I mean you cannot change it to a board of directors and a CEO. I mean, we struggled and fought and we put all this stuff in there and these specific things, and frankly we said we need a second repository and you have to get on with it because we figured you were going to be right in the mess you are in. When you said you were not going on with it you gave the whole body politic a second shot at not wanting the thing.

Now, maybe they would have done it anyway, and I am not trying to heap undue results on your shoulders, but you played right into what Slade Gorton and a whole bunch of people said was going to happen. If you are sticking on the one repository, you are telling one whole part of America, you take all the waste, and that happened. Now, I hope we can get out of the mess, but I regret to tell you I do not think—you know, you want to know what the board of directors is saying. This member of the board says we have got to change some laws if we are going to do this. I am not sure of that, but that is what I vote for.

I mean, you get on with following the law or you conclude you cannot, throw up your hands, and we amend it in some way. Now, I have not thought that through terribly in depth, but that is what I think, a very nice, neat effort, but I really am afraid it is not up to the struggle we have had and it will not get rid of the problem. I mean, the same reason we took so long to write the law is going to affect your desire that this board of directors help you.

I mean, the board does not agree. That is why we finally produced a bill. So having said that, let me just ask you one question. We appropriated, to my recollection, Senator Johnston, with Mark Hatfield leading the team, we appropriated $420 million and we said you could have an extra 79 for this program but we put a condition on that 79 because we wanted you to take a special effort at working with the States. These words, consultation and cooperation, that could end up actually with negotiating an agreement with States.

We said you do that, and the $79 million we held back was kind of conditioned on your doing a good job at that. What have you done on consultation and copperation efforts, or have we reached the point where the States are so angry that you just cannot proceed?

Secretary HERRINGTON. Senator, I am convinced that we have made every effort for C&C agreements and we have talked this over at great length. It takes two to make an agreement. It is like arms control. You can talk and talk and talk. Whatever proposal comes out of one of these three States, let us have a national forum to debate it. Let us have other things happening. We have gone the extra mile and I continue to go the extra two miles. We need to work this. But the plain fact is this.

The political climate is, these three States do not want the nuclear waste site in their State, and they will continue to fight it. We have ongoing litigation in every court they can possibly file. It is difficult, and I have to disagree with you that we have jeopardized the program on the second repository site decision. I think this program is moving forward in good shape. It has caused a lot of heartburn to a lot of people. People in my own Department wish it was in some other Department. But I think we are doing a good job on it.

Senator DOMENICI. Look, let me phrase it another way. I do not know whether anybody is going to be able to carry it out. Okay? I will start with that. But frankly, I do not think you can just ignore the statute and think that we can have some conciliatory process and make it work, and how you go from that statement to getting something to work I think is going to take a lot of time and effort by a lot of us, but I just do not think we can casually say we think you are doing good. Let us all agree with that and go. You are doing great. We love you. This is neat. I do not think anything will happen.

Secretary HERRINGTON. I do not know of a single person in this program who has been told they are doing well by anybody. We have people coming back from New Hampshire and some of these States that say do not ever send me to that State again. I mean, this is difficult stuff, and nothing can be handled casually in this thing, and I hope we have not been casual about it, but I am looking to Congress. It is not going to be 100 percent to pat us on the back and say, good job. I want Congress to say either through the appropriations process or through this Committee, you are on the right track. If you do not, I have to go back to the drawing board and reevaluate this Act and take a different approach. I think this is a reasonable approach.

Senator DOMENICI. Thank you, Mr. Chairman.

The CHAIRMAN. I must say if I may interject that simply by appropriating money does not mean we approve specific decisions like cancelling the eastern repository. We have to appropriate money, but simply because we do will not mean that any imperfections in following the law are somehow agreed to.

Secretary HERRINGTON. Mr. Chairman, I want to try to get this word "cancel" out of the vocabulary. Page 11 of the draft Mission Plan amendment says we are committed to a second site, and it goes into great detail as to how and when that decision has to be made. Over and over we have the issue of did you cancel and why did you cancel, and we have got to clear that up. It has slid. Other time frames in this program have slid in our Mission Plan. We are not perfect on this. We think this is realistic, but cancelling is not in our vocabulary.

The CHAIRMAN. Senator Bingaman.

Senator BINGAMAN. Thank you.

Mr. Secretary, let me just follow up on my colleague, Senator Domenici's questions and say that I agree with the sentiments that he expressed. It strikes me that an underlying assumption of the proposal to postpone the second site is that the political climate, which is today very hostile, will improve. Is that inaccurate? Is it your assumption that things will—that it will become easier to do this as we put it off?

Secretary HERRINGTON. I have to say that I think they will become easier but that is not a reason for putting it off. I am very hopeful that people as they come to understand this plan and as we work in the States can explain what we are doing and the technical soundness. I cannot promise it, but I think it will happen. We would certainly like to see us lessen the impact.

Senator BINGAMAN. Well, let me just say that I am doubtful that it will become easier. I am more inclined to think that it will become more difficult, and as a political matter the more the Congress were to go along with postponement, the more difficult it would be to ever proceed. I do not know if that is an accurate assessment. Everybody has got their own view of what the future might bring. But I just have the sense that postponement and the Congress going along with a decision by the administration to postpone is contrary to getting the job done.

Secretary HERRINGTON. Senator, let me say two things. We are at a crossroads for this program, and I think everybody here understands that. This is a very serious crossroads where we get the direction of this program. For the first time, we are starting to get some really serious questions from business people and affected States asking what is this program all about, how does it work, what kind of impact aid is there, how does the transportation system work—people are beginning to really focus on it. You have a national election gone. The politics are out of it. There is some serious thinking going into this thing. It has been so hyped and so political and such a media event up to this point I see some erosion now.

I do not believe that this extension of five years is going to make a big difference. The fact is this. Our technical people tell us we cannot meet the time deadlines in here. We will pull out all the stops and do everything we can to meet these deadlines, but realistically you have to know that 1998 is not a realistic date at this point.

Senator BINGAMAN. 1998 is not a realistic date to——

Secretary HERRINGTON. Accept the first waste, unless we have an MRS.

Senator BINGAMAN. What about the second repository, though? Now the dates on that, is there some technical reason why we cannot meet the dates the law prescribes for that?

Secretary HERRINGTON. No, I would say not. It is simply a business decision. The second repository does not need to come into being until 70,000 metric tons exist in the first repository, and that will not happen in the time frame laid out in the Act and, that tells us we will not need the second until 2025, so it is simply a scheduling problem. Our point is this. You need 25 years to go through the process and build it. Therefore you do not need to make a decision on where the candidates are until the mid to late 1990s. If you do it today you are going to have a lot of grief and you are also going to have an expenditure of $700 million to $900 million.

Senator BINGAMAN. I am just wondering if you are going to have a lot more grief if you do it today than if you do it in the mid-1990s. I am just wondering if the longer you postpone the decision on the second repository the more grief you do not encounter.

Secretary HERRINGTON. There is one important point that I think you all have to remember. The second repository is not authorized. It is only the first repository that is authorized for construction, so we do not have a clear signal yet on the second repository as far as authorization.

Senator BINGAMAN. So it is your view that Congress did not intend for you to go forward and pick a site for a second repository?

Secretary HERRINGTON. No, sir. It is my understanding that Congress is very clear on this. They want a second repository before we have more than 70,000 metric tons of waste in the first repository.

What I have said is, the timing can slip to the mid to late 1990s on the decision on where the candidates are.

Senator BINGAMAN. But as you understand what Congress has directed you to do, have we directed you to go ahead and identify a site for a second repository at this time? Or is that not part of your instructions?

Secretary HERRINGTON. The lawyers that have reviewed our draft Mission Plan amendment say that we are within the terms of the Act and that we are acting legally in putting in this draft Mission Plan amendment our suggestion to make that decision in the 1990s provided we are still committed to the second repository, and we are.

Senator BINGAMAN. So you think the statute as drawn gives you the flexibility to postpone a decision until the mid-1990s on any second site?

Secretary HERRINGTON. On the siting, yes.

Senator BINGAMAN. On the location of the second site.

Secretary HERRINGTON. Now, that is what our draft Mission Plan amendment says and that is what we think is within the law. I really need Congressional input on this. It is a very gray area. I need the Congress to say yes or no. I mean, the motives of the people working in this program, Ben Rusche, myself, the hundreds of people that are working on this, their motives are good. We want to do what you want us to do.

Senator BINGAMAN. Well, I certainly do not question your motives at all. I guess again as one member of this board of directors that you referred to I believe postponement makes the issue more difficult. I believe that at least from my perspective you need to go forward as quickly as humanly possible and implement the statute. And I will go back and read the statute in light of your statements, but I had thought the statutes mandated the picking of a second site before the mid-1990s, but I will certainly review that.

The CHAIRMAN. If the Senator would yield on that, if I may read into the record an opinion from J. Michael Farrell, General Counsel of the Department of Energy, to Ben Ruche dated September 5, 1986, he says, "Congress intended to reserve an opportunity for de novo consideration before construction of any second respository. It nonetheless left intact the specific requirements to make recommendations regarding the site of the second repository in 1989 and 1990. As statutory requirements they remain intact until repealed, amended, or supplanted by new legislation adopted through the constitutionally required procedures of bicameralism and presentment to the President."

Senator BINGAMAN. Mr. Chairman, may I please just ask one additional question on the same subject? I am just reading Public Law 97-425. It says here, "Not later than March 31, 1990, the President shall submit to the Congress a recommendation of a second site from many sites already characterized that the President considers qualified for a construction authorization for a second repository."

That strikes me as a fairly clear mandate that you cannot wait until the mid 1990s. I do not know how your attorney explains that away.

The CHAIRMAN. What I just quoted was consistent with that.

Senator BINGAMAN. Right.

Secretary HERRINGTON. This is a quote from the general counsel of the Energy Department. There are a number of time frames in this law, one that was set forth, and as it is today, many of those time frames have slipped in the mission plan. We have not been on schedule. Congress has not said anything. We are saying today this is another one we would like to slip to the mid-1990s. If you do not okay this or if you do not appropriate according to the plan we will go back and review that and take a stricter interpretation.

Senator BINGAMAN. How does the action or inaction of Congress in appropriating money influence a specific statutory requirement that you submit a second plan by March 31 of 1990? I do not understand that.

Secretary HERRINGTON. My feeling is that like all of these projects when they are instituted, you cannot cover every contingency when you make the law. We are now trying to formulate the solution to the law and getting it moving and guaranteeing that we get a repository, and we have not taken any irrevocable action on this. This Plan says how we do it. And in here it says we would like to slip the decision on the second. That may require changes in legislation. I do not think so. I think doing it through this document can ensure that new date.

Senator BINGAMAN. Thank you, Mr. Chairman.

The CHAIRMAN. Senator Hecht.

Senator HECHT. Thank you, Mr. Chairman.

Mr. Secretary, as you know, in Nevada we have the weapons nuclear weapons testing, which I think is very important for not only the security of America but the security of the free world. Last June I asked you about the effect of manmade earthquakes resulting from nuclear weapons weapons tested the at Nevada test site. Have you addressed that in great detail?

Secretary HERRINGTON. Senator, largely through your intervention and your bringing the subject up to us we have flagged this particular issue for the Yucca Mountain site because of its proximity to the test site. We do not know what the effect is, but it is one of the things that needs to be investigated during the time that we go through the characterization. I think you will be pleased to know that every bit of work has an independent review on each site, independent through the National Science Foundation—excuse me, the National Academy of Sciences. There is an independent check on everything our technical experts do on this.

Senator HECHT. Just for the audience, so they will all know in yours and my vernacular, it is about a good four iron away. Is that about right? A little bit further than that.

Secretary HERRINGTON. Certainly not my four iron.

Senator HECHT. Also consider the fact that Yucca Mountain lies on an earthquake fault line and there is a live volcano roughly 100 miles away. Why did you not address that in your Department of Energy study?

Secretary HERRINGTON. We have considered those on a preliminary basis through the EAs, which are the environmental assessments, but they need to be considered in depth, and we will.

Senator HECHT. Let me ask you this. I think that we should have a scientific panel composed of independent scientists who understand earthquakes and what they would do, how they could trigger another earthquake because of the close proximity. Would you support or oppose an independent scientific panel looking at this?

Secretary HERRINGTON. I just do not see any benefit out of that. I think the National Academy of Sciences is as independent as you can get, and they will run a thorough review of all the technical bases. I think the State of Nevada should have an independent seismologist/geologist person to work with us and to review our results. I do not see the good you could get out of an independent panel.

Senator HECHT. Just to clarify that issue in people's minds, safety is your Number One priority and you are doing everything you can regarding safety. Would you be against it if I would ask the Chairman to have a scientific panel independent of DOE?

Secretary HERRINGTON. I would like to review with some of the technical experts what effect that might have on the process and further delay in the process. I am very concerned about trying to meet these timetables, and I would like a chance to submit that answer for the record.

[The information follows:]

The Department of Energy has asked the National Academy of Sciences to make the Board on Radioactive Waste Mangement available to provide Board oversight of activities during the important site characterization phase in the first repository program. The Academy has responded positively in fulfilling this responsiblity and actions are in process for implemention. Such oversight would give particular emphsis to site-specific activities and to the establishment of scientifically sound criteria and methodolgy for comparative evaluations of the candidate sites through the establishment of suitably constituted panels of the Board.

We believe that there is no group better able to fulfill an oversight responsibility for the site characterization phase in the first repository program than the National Academy of Sciences' Board on Radioactive Waste Management. This Board can marshall the best expertise available to provide independent oversight of the Department's technical activities during site characterization. The panels established by the Board will certainly consider such site specific concerns as the potential for earthquakes at the Yucca Mountain site and other technical concerns identified by State and Indian Tribe representatives.

Senator HECHT. Fine. In reviewing the amendment to the mission plan I noted that you proposed to have the site characterzation work begin at Yucca Mountain before it begins at the other two sites and finish at Yucca Mountain before it finishes at the other two sites. Why did you do that?

Secretary HERRINGTON. There is no particular reason. I would ask Mr. Rusche if he would comment on that.

Mr. RUSCHE. Senator, the characterization effort is indeterminate in terms of the actual requirements of the work that we are going to be doing. Prudence dictates that as soon as we can begin we ought to begin and get the information as soon as we can. That is purely and simply the rationale.

Senator HECHT. Do you not think it would be fair for all the sites involved if we did it all at the same time, started and finished at the same time?

Mr. RUSCHE. I have no earthly way of telling what those times are.

Senator HECHT. We will get back together on that.

Mr. RUSCHE. I would be glad to discuss it further, sir.

Senator HECHT. I have been advised that your own documents say you have starting dates of the first quarter of 1992 for the tuff site, the basalt site starts the first quarter 1993 and the salt starts the first quarter of 1993.

Mr. RUSCHE. Those are the earliest times we can begin, given the preparation that is required for all of the sites, including the Nevada site.

Secretary HERRINGTON. Senator Hecht, one of the things we have to remember is that you have to drill two vertical shafts in three different and distinct types of geologic formation, to different depths, encountering unknown things along the way. I do not know that you can plan this to begin and end at the same time.

Senator HECHT. I am going to give you a little map of America right now, and I want you just to look at it, and I am going to give the press one, too, and it shows of the roughly 124 commercial nuclear power plants either at work now or under construction practically all of them are in the east and yet the sites are in the west. You mentioned transportation. Will this not be a tremendous amount of excess cost?

Secretary HERRINGTON. This has been a question of east versus west that has come up many times in administering this program. I do not think it was the intent of Congress to make this an east versus west issue. The issue is where is the best geologic repository, and we have looked around the country and come up with five sites, and recommended three for characterization. To me cost is not your Number One factor in dealing with this subject. It is the viability of the program, it is the integrity of the project, and it is how you handle it.

Senator HECHT. Let us go on. You just mentioned cost. I understand we are studying other countries and how they handle their nuclear problem, nuclear waste. France is recylcing their nuclear waste. You have mentioned 70,000 metric tons. Have you taken into consideration during this extra five-year study the feasibility of recycling our waste?

Secretary HERRINGTON. Yes, we have.

Senator HECHT. What have you come up with?

Secretary HERRINGTON. The French were here this week, the head of the French nuclear CEA, and I have met with him in France. If you reprocess it does not change your waste problem. You are dealing here with a unit of heat and the volume is what is important. The idea that you can reprocess waste and get less waste is simply not viable.

Senator HECHT. I am led to believe that you can get rid of 85 to 90 percent of what they call the hot stuff.

Secretary HERRINGTON. I will let Mr. Rusche comment on the technicalities of it, but after talking to the French and West Germans and Japanese, I am convinced that that may not be technically correct.

Mr. RUSCHE. Senator, the basis for design of a repository or a disposal facility is essentially based on the ability to dispose of heat that arises from the waste or the spent fuel. It is true in reprocessing the material, you can recover unexpended fuel such as plutonium and uranium and recycle that material, but the amount of waste that is generated is the same for each megawatt hour or megawatt day of energy that is extracted, so although the volume of the material, if looked at in its pure form, could be changed, it does not seriously affect the design of the repository.

I would be glad to discuss that in more detail.

Senator HECHT. Also your handling of military waste and civilian waste is done differently today. Is that correct? Is the military waste recycled and used again for plutonium?

Mr. RUSCHE. The military waste is from reprocessing of defense fuel for the purpose of producing materials for the national defense program. It does not recycle the waste. We are recycling, or recovering and reusing fuel.

Senator HECHT. I understand that. All right. But you do handle it differently, the military from the civilian.

Mr. RUSCHE. Indeed, after reprocessing the waste in the United States for the defense program or in France or in other countries that might be reprocessing, it is generally thought of as being placed in glass or vitrified material for disposal.

Senator HECHT. Are you going to analyze this? In other words, is this in your opinion the right way to go, to have two different waste types, in other words, two different processes for military and civilian?

Mr. RUSCHE. I believe, sir, if you look at the Act, the Act requires the repository to be capable of accepting both types of waste so that if the industry were to choose to reprocess, we would be required to have the repository designed to receive such material. It just happens that for the national defense program that is the form in which it appears. Both forms are acceptable, and the repository is capable of accepting and disposing of both forms.

Senator HECHT. I have a lot of other questions, Mr. Chairman, but I know others want to speak, so perhaps I can come back at a later time.

The CHAIRMAN. Thank you, Senator Hecht.

Senator Evans.

Senator EVANS. Thank you, Mr. Chairman.

Mr. Secretary, I do not want to revisit questions which have been asked by virtually every one of the preceding Senators. Are you willing to recognize now—we can get off this if you are willing—to stipulate that in spite of best intentions that under this Act it is illegal to postpone deliberately any part of the Act, the deadlines of which are explicitly set forth in the Act?

Secretary HERRINGTON. I do not think I can accept that statement in totality.

Senator EVANS. Well, to what portion do you accept it?

Secretary HERRINGTON. We feel that we have acted within the spirit of this Act by preparing this draft Mission Plan amendment.

Senator EVANS. I am not talking about actions today. I am talking about actions that were taken six, seven, eight, nine months ago.

Secretary HERRINGTON. I think you can postpone the decision on the site. You certainly cannot cancel it.

Senator EVANS. Where in the Act, not now because I am sure you cannot find it, but would you please search and tell me where in the Act you find that ability to unilaterally postpone explicitly without amendment of the Act explicit deadlines which are very clearly established, the numbers, and it says "shall"?

Secretary **Herrington**. I will endeavor to search the Act and find that, sir.

Senator **Evans**. I listened with great interest to the CEO versus board of directors relationship. I have had an opportunity over time to serve on half a dozen or more corporate boards of directors. I must say that if a corporate board of directors gave to a CEO explicit requirements to carry out certain functions and the CEO on his own decided that he wanted to modify or change those. If we then came back nine months later and asked the board of directors for ratification after the fact, as you are now doing with your revised mision plan, what do you think the action of the board of directors would be?

Secretary **Herrington**. Obviously, that is a hypothetical question. [General laughter.]

Senator **Evans**. It may not be too hypothetical.

Secretary **Herrington**. Let me ask you one. What would you do with a CEO who did not come back to you as the board of directors and said, look, we do not have to spend $700 million or $900 million and in fact we may not need the site based on current projections of U.S. waste. What if I moved ahead and spent this money and moved on an unreasonable course without coming back and saying this is an alternative. Is it reasonable? Is this within the spirit of the law? And is this something you would like us to do?

I think I am meeting my responsibilities here. I can guarantee you, Senator Evans, that we will carry out the spirit of this law on a strict basis, and if this draft Mission Plan amendment is not approved affirmatively or if the budget is not appropriated, if we get any signals from the Congress that this is not the thing to do, then we will go back to the drawing boards.

Senator **Evans**. I would thoroughly agree with you. I would be terribly disappointed if that CEO had not come back and said: "Look, here is the way to save some money, here is a way to do the job better, let us try to do it, give me the opportunity to do that." In this mission plan you are right on target. You are just a year late. You did not come and ask us first. You went ahead, did it and then told us. That is not the proper relationship between a board of directors and a CEO, in my view.

Secretary **Herrington**. First of all, there has been no prejudice at this point. The decision was made in May for a postponement. This report was prepared and it is before the 100th Congress now. I think we can agree the program is not on the proper times and we need a five-year extension. We ought to debate that now. We ought to look at the second repository timing. We should not walk away from it all. We ought to endorse the MRS proposal that we have in this plan. We need an MRS or this program is not viable, and this is the year to set this plan in concrete and make this thing viable because we need it.

Senator **Evans**. I certainly agree.

Senator **Domenici**. Would the Senator yield?

Senator **Evans**. Yes.

Senator **Domenici**. Let me say, Mr. Secretary, you brought the analogy of the COE and the board up. I just want to tell you in response to your question about the $700 million to $900 million and the second repository, if I am one member of the board I would not fire you, as you imply. I would give you a bonus if you spend the $700 million to $900 million on the second repository if you get a first one started, which is indeed what this Act has in mind. You will not go with that second one down to the final point unless that first one has got started, and for that you would get a bonus, so I do not think this board member thinks you would be wasting money. I just want you to know that.

Senator EVANS. Let me proceed. If we were running corporations around here we would be bankrupt by now. And that is not aimed at you, Mr. Secretary. That is aimed inward.

I have a whole series of questions. I will not pursue this one any more. I am frankly not satisfied. I do not think that there has been an appropriate understanding of the relationship and the timing and what comes first, but I will not pursue it because it is apparent we are not going to get that kind of response.

I have a number of questions that deal not only with the second repository postponement. They deal with the multiattribute utility analysis that was carried on for the development of the first repository sites, the question of geologic diversity, the question of costs, the question of composite scores. These are questions which have been asked before. They have been asked here and they have been asked in the House of Representatives, and so far they have not been adequately answered. Many of them have not been answered at all.

And I will also ask that you respond directly to an internal document of your own department, an internal document which lists some rather substantial what they call serious shortcomings in the final report that typified the first three sites. I think they are damning in their description of that shortcoming, but I will not ask any of those now. I will ask them for the record.

I would like to turn to something now if I can that I hope is a little more positive. First, on the C&C agreements, I think it is safe to say, and I would like your comments, that the State of Washington for the past four years has probably had more negotiations with DOE and has moved more strongly and been willing to attempt to get to a successful C&C agreement than any other State. Is that accurate?

Secretary HERRINGTON. That is accurate.

Senator EVANS. With all of that I think there is some current disappointment. I know because I have talked with the governor recently. They have a chronology that goes clear back to July of 1983, and there have been scores of actions and development work along this line, and I believe we are at a point where the Governor is going to tell you that he feels that at this point there is no real hope of getting a C&C agreement unless there is some considerable change in the way we do things.

He has made a suggestion which is somewhat different. I think it is a good suggestion that calls for a process, a conflict resolution process. As far as I know he has not even received an answer from the Department commenting on that particular proposal.

Secretary HERRINGTON. We are well aware of the proposal, Senator Evans, for the national forum to review the siting of——

Senator EVANS. That is correct.

Secretary HERRINGTON. I have seen a draft of the answer and we are ready to send the answer. I can comment on what my personal view is as the manager of this program, and that is this. This is the national forum. What bigger national forum can we have to review our siting process and what we have done to interpret this law than we have today? Putting the issue to an independent group or a panel of experts to me does not make sense.

Senator EVANS. You are dealing, I think, with the specifics of one State and its relationships. I believe that it is a very strong move toward the potential of a successful—moving toward a succesful C&C agreement. This Senator, at least, is going to fight as hard as I can to deny you the $79 million that has been set aside for this fiscal year unless there is stronger action taken toward working toward that agreament. I think the Governor's proposal may have been such an opening, and I would hope that you would not reject it.

Secretary HERRINGTON. I will tell you right up front we want a C&C agreement with the State of Washington and they will go back and go the extra mile and we will redouble our efforts to make it work with the State of Washington. You have to understand, and I think you do, the political climate in the State of Washington does not want a waste repository in the State of Washington, and we will do everything possible to keep it out of that State.

Senator EVANS. We are not unique.

Secretary HERRINGTON. You are not unique. That is the nature of the beast that we are dealing with.

Senator EVANS. I have said it before and will say it again, that I think the process ought to be carried on as explicitly and as promptly as we can under the law. We ought to do this job as scientifically as we can. We do need a long-term repository eventually. I think we are backwards in the Act in terms of the order of things. But if it ultimately comes down to the fact that a State of Washington site is the safest, the best, that it is adequate, that there are no adverse environmental considerations, then we ought to be prepared to accept it, and I for one would say so. But we have not proceeded with Step 1 in my view along that line, and we have gotten badly off target.

Let me, if I can, Mr. Chairman, just ask a couple of questions that I hope will be a little more positive, because they deal with where do we go from here and what should we really be doing. It seems to me four years after the passage of this Act there are substantially changed circumstances. You have recognized that in delaying the development of a second site. We have potentially less waste. We have new technologies, at least modest new technologies that are emerging.

First, section 222 of the Act requires DOE to accelerate research and development and alternative means and technology for the disposal of high level waste. This is funded from general appropriated funds, not from the one mil per kilowatt-hour or fee that goes into the nuclear waste fund.

Why do you feel that it is prudent at this point to terminate the subseabed program, for instance?

Secretary HERRINGTON. I would like Mr. Rusche to answer that. I have looked at this carefully. I am not obviously a technical expert on subseabed. I do know from talking to foreign countries and experts in the meetings that I have gone to that this is not a fruitful direction to travel in and most countries are going to deep geological storage.

Mr. Rusche, if you could comment on that.

Mr. RUSCHE. On the specific point, Senator, we did not request additional funding beyond 1986 for the subseabed program because we had reached an understanding and agreement internally that it was appropriate to bring the program to the point of analysis and convergence and evaluate it, and that is being done in 1987. We found that our international partners in the United Kingdom had taken the same course. When we get that analysis in hand we will take a look and see whether the program ought to go forward.

We had a rather ambitious schedule to try and determine technical feasibility by 1991 and we concluded we needed to to stop in the intermediate time period and take a look. We may decide that we want to continue that program after we have the data in hand.

Senator EVANS. In another sense research and development are at least an alternative proposal. I had a chance to meet, as I am sure you did, with the representatives of the Swedish nuclear waste management system. I understand that their plan is to allow the spent nuclear fuel to be stored on an interim basis for up to 40 to 50 years. In other words, they intend to go first to an MRS for an extended period of time to allow a large portion of the heat to decay and many of the short-lived radionuclides to dissipate.

Are you considering this type of storage as an alternative: a longer interim storage period prior to permanent disposal which reduces very substantially at least the heat dissipation required after you put it in long-term storage?

Secretary HERRINGTON. If I could have Mr. Rusche answer that, please.

Mr. RUSCHE. The specific criteria that the Swedes used over the 40 years or 50 years or so of cooling is a definite step in their sequence.

We elected, because of provisions in other statutes—in fact, we were directed by such statutes—to be in a position to accept fuel that was no younger than five years. That is, we have to design the repository to have the capability to accept five to ten year old fuel.

The reality of the matter is that with the reactors operating, and with the schedules that we have, the average age of fuel being emplaced in the repository, beginning in the year 2003 under the proposal that we have before you, would be between 20 and 30 years old.

After about 20 to 25 or 30 years additional cooling of the fuel, that is, decay before emplacement, it does not materially reduce the heat load, which is the primary basis for setting the parameters for the repository

Senator EVANS. You're talking about just the initial original spent fuel rods—but there will obviously be continuing waste developed. And once of all of this process is in the system, it's a question of how long and under what circumstances it should be——

Mr. RUSCHE. Under the provisions of the Act and the program, even with two repositories receiving 6,000 tons per year, which would be the expected rate, the mean age of fuel being emplaced in the repository I think will exceed 20 years over the life of the program.

Now, that's not a design basis. You design to be able to receive fuel as young as five years, if we need to.

Senator EVANS. Would you submit for the record just a simple graph that shows the rate of heat decay versus time.

Mr. RUSCHE. I would indeed; be glad to, sir.

[The information follows:]

Senate Committee on Energy and
Natural Resources
Jan. 29, 1987

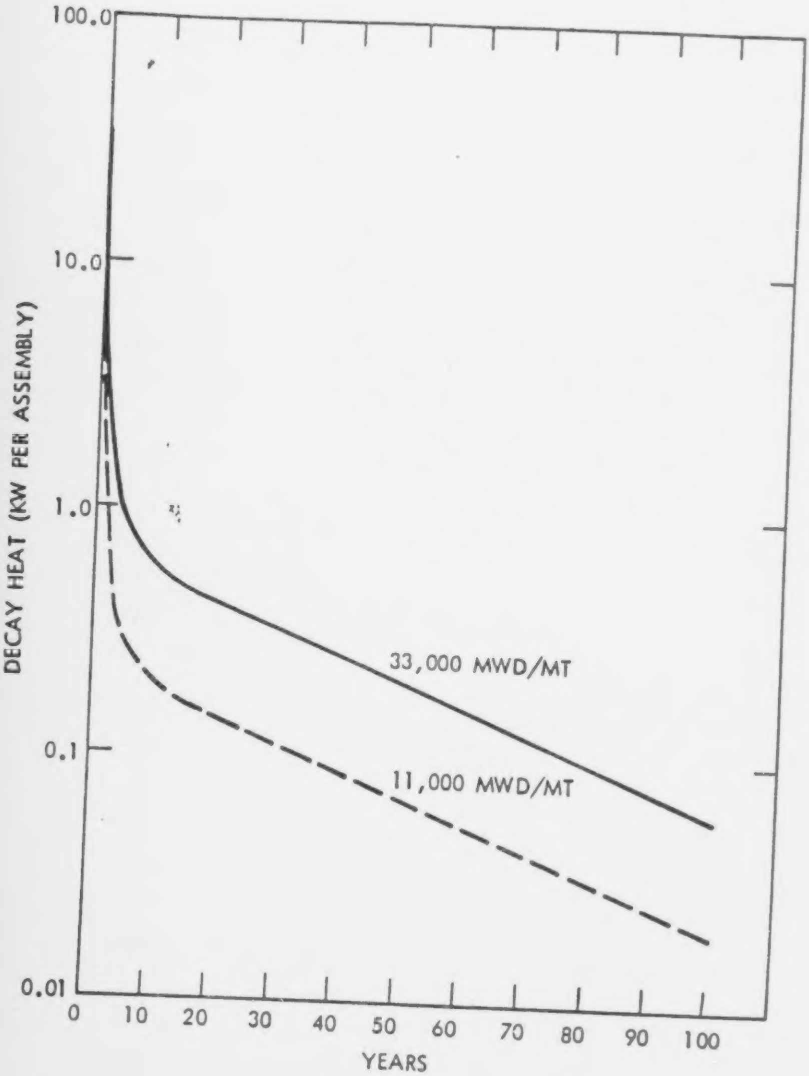

Figure 7. PWR fuel assemblies decay heat curves.(6)

(6) E.M. Greene, "Spent Fuel Data for Waste Storage Programs," HEDL-TME-79-2
September 1980.

Senate Committee on Energy and
Natural Resources
Jan. 29, 1987

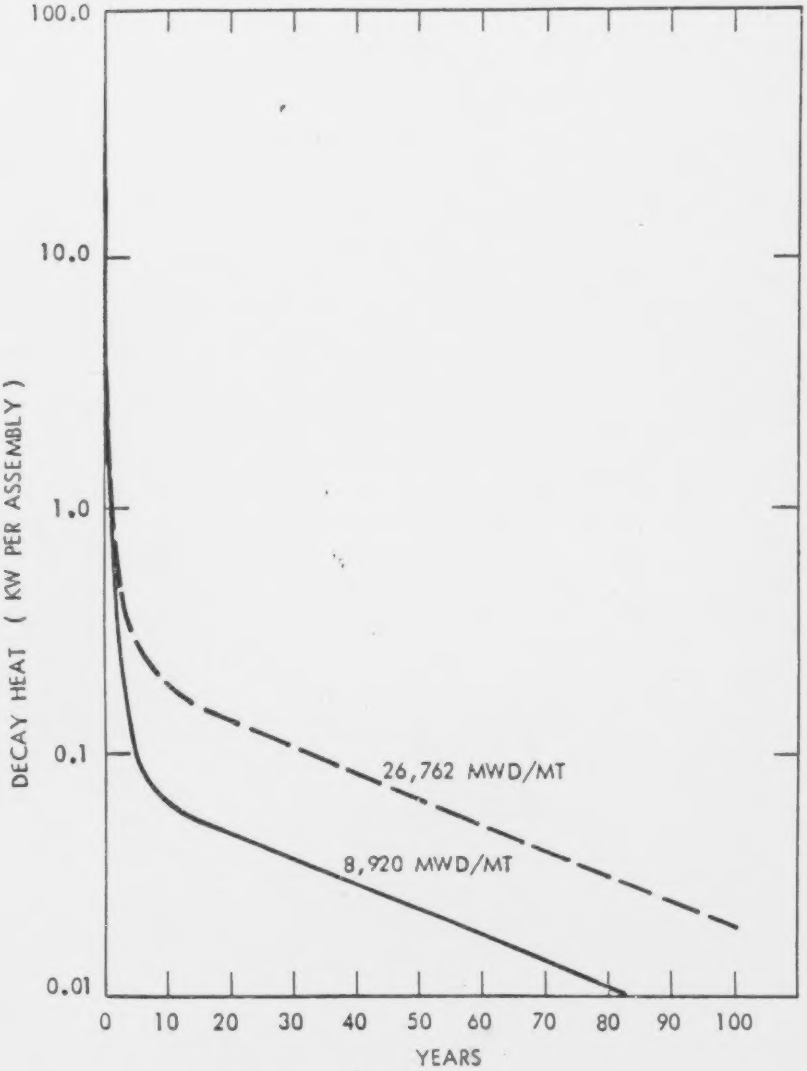

Figure 8. BWR fuel assemblies decay heat curves.(6)

Senator Evans. One other alternative, Mr. Secretary: Do you think it is appropriate at this time to take a thorough look at the act and its provisions in order to reexamine the whole question of reprocessing and reuse of a certain share of the nuclear waste?

I understand fully the proliferation and other arguments that were used a decade ago. Do those still hold? Or is this an appropriate time to take another look?

Secretary Herrington. I think it is a commercial decision. I don't think that's a waste decision. I think it's going to end up being decided in the commercial arena.

Senator Evans. Could you describe any other alternatives that you have been considering, or that have been suggested to you, in terms of potential long-term waste disposal, either in location, in type, or whatever. In other words, we're looking today for a permanent repository, I think we ought to look as broadly as we can at where we now stand and what we ought to be doing?

Secretary Herrington. Obviously, the letters and the mail would fill this room. The comments, I think, we delivered to the Congress file, I think 22 filing cabinets and we have probably another 122 that could come.

Everything from shooting it at the sun on a Saturn rocket; dumping it down volcanoes; it just is an amazing plethora of suggestions on what to do with this waste.

And I think we've looked at a lot of things and will continue to look at a lot of things. I don't have any special concrete proposals that I could say today that would tell you, in my best judgment, that we can do a better job.

I think that deep geologic disposal makes a lot of sense. I think the program is viable, and I would like to stand on this program.

Senator Evans. Have you had any volunteers from throughout the world who would just as soon locate a site and manage it?

Secretary Herrington. I have hinted at some commercial interests this morning from people that are interested in what are the possibilities of this, to foreign countries who said, we'll take your waste. That puts us deep into the nonproliferation program——

Senator Evans. I understand.

Secretary Herrington [continuing]. The United States exploiting Third World countries. It looks like a dead end to me. And it has to be something that Congress wrestles with; not the Department of Energy.

Senator Evans. I thank you.

Thank you, Mr. Chairman.

The Chairman. Thank you, Senator Evans.

I believe Senator Adams was here first. Alphabetically, he's first, so we will recognize Senator Adams and welcome him to the committee.

STATEMENT OF HON. BROCK ADAMS, A U.S. SENATOR FROM THE STATE OF WASHINGTON

Senator Adams. Thank you, Mr. Chairman.

I wish to express my appreciation to you and the other members of the committee for allowing me to be here this morning.

And I am very pleased to be here to symbolize the interest of the State of Washington, which is very well represented by our senior Senator from the State of Washington, Mr. Evans, who sits on this committee; and we are grateful to have him there.

But Mr. Secretary, when I met with you in December and we had a rather frank talk about this, I have to admit I was discouraged, because I didn't sense a lot of give on your part on the concerns which I expressed.

And I wanted you to know that this comes not only from a referendum in our State where over 80 percent of the people registered their disapproval of the process or system that had been used, but also that the consultation and cooperation system had broken down and had not been used.

And Mr. Chairman, I would like to ask unanimous consent that I might enter in the record at this point the schedule that was referred to by Senator Evans that came from the State of Washington of the chronology of attempting to get consultation and cooperative agreements with the Department, and the fact of why they haven't been done.

The CHAIRMAN. Without objection.

[The prepared statement and additional material submitted by Senator Adams follow:]

OPENING REMARKS - SENATOR BROCK ADAMS
SENATE ENERGY AND NATURAL RESOURCES COMMITTEE
January 29, 1987

Mr. Chairman, members of this Committee: I very much appreciate your willingness to allow me to be here today. As you know, this issue is of particular importance to my state. And while our interests are ably represented by my senior colleague who has the privalage of serving with you, I hope that my presence here can serve to symbolize -- both to you and to the administration --the significance of this issue to the state of Washington.

Mr. Secretary, after we met in December to discuss the nuclear waste disposal issue, I must confess that I was discouraged. I didn´t sense a whole lot of give on your part or a willingness to listen to the concerns that I was expressing.

As you know, I´ve been critical of the way the Department has made decisions on nuclear waste. Obviously my state has a parochial interest in this issue, but the entire nation ought to be interested in the principles at stake here.

DOE has too often given lip service to making decisions based on a scientific process. Again, yesterday in announcing that the proposed changes to the Mission Plan, the Department defended the deferral of the opening of the first repository from 1998 to 2003 on the need to carry out a so-called "high quality technical program". What the people of my state want to know is why, after the Department has chosen them as one of three final candidates for the repository, we suddenly see a preoccupation with high quality technical evaluation.

Make no mistake, Mr. Secretary, North, South, East and West, we as a Nation must develop the means to permanently dispose high-level nuclear waste. The people of Washington State have lived with this hazard for more than 4 decades; longer than anyone else. A solution must be found, but also make no mistake Mr. Secretary your solutions will not do.

This fall a referendum appeared on the ballot in my state which in essence was a vote of no confidence by the people of Washinton State in the way you and your department have dealt with them and with this program. The referendum was passed with an 80% approval vote.

Let me begin my questions to you with one final thought. The Nuclear Waste Policy Act, if nothing else, established for the first time in statutue what the ground rules were going to be for the Federal Government in carrying out this program. It was supposed to put an end to the ever changing, ad hoc, and chronically suspicious way in which the Department conducted this program. If I understand what is in your proposed Mission Plan, which Mr. Rusche presented here yesterday and what you have confirmed here this morning, we are once again being plunged into entirely ad hoc nuclear waste policy, outside of the 1982 Nuclear Waste Policy Act.

STATE OF WASHINGTON

Report to Congress Concerning Consultation and Cooperation Negotiations with the U.S. Department of Energy

January 1987

The state of Washington report to Congress Concerning Consultation and Cooperation Negotiations with the U.S. Department of Energy (USDOE) will review past actions, assess the current situation, and summarize the reasons why agreements have not been concluded.

PAST ACTIONS: From July 1983 until December 1984, the state of Washington and USDOE made a good faith effort to negotiate. In spite of many long negotiating sessions, the parties were unable to resolve many serious issues such as federal liability, defense waste, water rights, foreign waste, transportation, work suspension, emergency response planning and other issues. The state became convinced that the C&C process was not effective when two Section 117(b) Governor's letters obtained positive results in the areas of defense waste and water rights, even though the subjects had been subjects of intense negotiations for eighteen months.

From December 1984 until May 1986, the state of Washington and USDOE were heavily involved int he Environmental Assessment process. Governor Gardner asked that USDOE do a credible comparative analysis with input from states, tribes and independent experts. The May 28 decision to include Hanford as one of the three sites selected for characterization even though it ranked lowest of all sites under consideration, and the illegal decision to indefinitely postpone the search for a second repository led litigation and the overwhelming ratification of Referendum 40 which directs state officials to continue challenges to the federal site selection process.

CURRENT SITUATION: The site selection process to date was a flawed, politically-based program that has destroyed USDOE credibility. Past actions and continuing litigation have created a situation where C&C negotiations at this time, are not a reasonable option.

WHY AGREEMENTS HAVE NOT BEEN CONCLUDED: Agreements have not been concluded because past negotiations were not effective and because the May 28th decisions have destroyed USDOE's credibility. C&C negotiations cannot be successful until credibility is restored. USDOE must take the lead in bring the program back on track. Governor Gardner's conflict resolution process is a reasonable, attainable proposal which could lead to a mid-course correction consistent with the Nuclear Waste Policy Act.

STATE OF WASHINGTON

Consultation and Cooperation (C&C) Chronology

July 1983: Negotiations began because construction of the exploratory shaft appeared imminent. From July 1983 to July 1984 there were twelve negotiating sessions with USDOE and twenty-one state negotiating team meetings.

December 1983: An early draft document was prepared and forwarded to the Nuclear Waste Board and the Legislature for review and comment. The Legislature passed Concurrent Resolution 142 which directed the negotiating team to place more emphasis on issues relating to foreign waste, work suspension, injunctive relief, federal liability, commingling defense wastes, emergency response planning. The Legislature passed a bill which provides specific procedures for negotiating, reviewing, approving and modifying agreements.

July 1984: Another preliminary draft document was forwarded to the Nuclear Waste Board. The Board considered using the document for public hearings, but many unresolved issues and the December 1984 release of draft Environmental Assessments put an indefinite hold on further review.

March 1985: Governor Gardner wrote Section 117 30-day letters to Secretary Herrington concerning defense waste and state water right laws and permit requirements for site characterization activities. Although the C&C teams had been unable to resolve these issues after nearly two years of negotiations, the Secretary's responses to Governor Gardner documented significant changes to earlier USDOE negotiating positions.

May 1986: USDOE announced its decision to include Hanford as one of three sites selected for characterization even though USDOE scientists and their consultants had ranked Hanford lowest of all sites considered for pre-closure factors, for post-closure factors, and composite overall ranking.

July 1986: Detloff von Winterfeldt, a nationally respected decision analyst who had been a consultant to the National Academy of Sciences (NAS) Board on Radioactive Waste Management, expressed serious concerns about the value judgments used by USDOE to make its decisions.

August 1986: Lee Olson, Richland Operations Office, wrote to Terry Husseman, Program Director, asked for a joint C&C meeting with other states and the tribes. Mr. Husseman's response questioned the need for joint meetings and suggested USDOE decision making be the first issue to be discussed.

October 1986: Congressional subcommittees reported conclusive evidence which lead to the conclusion that USDOE distorted and disregarded its own scientific analysis in order to support selection of Hanford.

November 1986: Ralph L. Keeney, a nationally respected decision analyst who had been a USDOE consultant during EA negotiations, issued a report which confirmed that Hanford is the least desirable site because of its enormously greater costs and its greater health effects are not compensated for its relatively slight advantage in environmental and socioeconomic impacts.

November 1986: Washington State citizens, in unprecedented numbers, support Referendum 40, which directs state officials to continue challenges to the site selection process.

December 1986: Eco Northwest, a consultant to the Nuclear Waste Board, concluded that the Recommendation Report fails to document its assumptions or its conclusions, and is a travesty of nearly everything that decision-aiding methods stands for.

December 1986: USDOE, in a letter to Governor Gardner, renewed the offer to negotiate. Governor Gardner and Ben Rusche met on December 18 to discuss C&C negotiations. In a December 30 response to the Office, Governor Gardner indicated that past actions and continuing litigation have created a situation where C&C negotiations, at this time, are not a reasonable option. He pointed out that negotiations cannot be successful until program credibility is restored, and that USDOE must take the lead in bringing the program back on track. He enclosed his proposal for a conflict resolution process which could restore credibility to the program. He asked Secretary Herrington to review and seriously consider the proposal.

Senator **Adams**. Thank you, Mr. Chairman.

Mr. Secretary, I don't want to repeat questions of the Senator from New Mexico, and the Senator from Louisiana, the Chairman of this committee.

I want to be very clear that we had, prior to 1982, an ad hoc system for taking care of nuclear waste. And as the Chairman so well stated, and other members of this committee who worked on this matter, as well as the statements of Members of the House who worked on this problem with this Senate committee, a decision was made to take that out of the hands of the ad hoc Department of Transportation system and create a very strict legislative system.

Now you have violated that legislative system, have you not?

Secretary **Herrington**. My answer is, no.

Senator **Adams**. All right. Now let me refer, then, to section 112 of the Act, which says: Not later than 180 days after the enactment of this Act, the Secretary, following consultations—it lists the groups—shall issue general guidelines for recommendation of sites.

That was not carried out, was it?

Secretary **Herrington**. That's correct.

Senator **Adams**. All right, 112, section (b), subsequent to such nominations, the Secretary shall recommend to the President three of the nominated sites not later than January 1, 1985, for characterization.

That was not met, was it?

Secretary **Herrington**. That's correct.

Senator **Adams**. Section (c): Not later than July 1, 1989, the Secretary shall nominate the sites that shall include at least three additional sites not nominated under paragraph A and recommended by such date to the President from five nominated sites three candidates the Secretary determines suitable for site characterization for the selection of the second repository.

That, you have stated in your mission statement, will not be done; is that not correct?

Secretary **Herrington**. That's correct.

Senator **Adams**. And you have stated in your mission statement also that the final date which is set forth later in the statute will not be met?

Secretary **Herrington**. That's correct.

Senator **Adams**. So we have a record here that the entire statutory framework, which involved a very difficult act by the Congress, and compromise by the Congress, has been violated by the Department in all major aspects, and now we are being asked what to do by you on a mission statement which confirms that we're right back to an ad hoc system of the Department of Energy running this, which was supposed to be corrected by a specific statute passed by the Congress.

Secretary **Herrington**. Senator Adams, like all legal constructions and lawyers talking, you are technically correct. There are hundreds of people working in this program who have put their best efforts at it.

Myself, I came on this job February, two years ago. This program was behind schedule when I took over.

I didn't do it, and I didn't cause it to be late, and I don't think Mr. Rusche caused it to be late.

When the law was passed, the opposition of the States and the political part of this issue I don't think were anticipated. The efforts at trying to bring local involvement, I don't think those were anticipated.

What you have is a series of efforts to meet the requirements of this law that were brought forward on a Mission Plan in 1985, and, many of these dates, have slipped.

From my own standpoint as the Secretary of Energy, I certainly didn't ask to have the President make this decision in May before a national election. I'd much rather have it done in January.

Nothing has been violated. Violated carries a connotation of intentional, political—what we're telling you here is——

Senator ADAMS. Mr. Herrington, I'm trying to leave the politics aside for the moment. I think Senator Domenici has commented on them and so on. And the politics are over—we have an overriding national concern to have a system, and that a Congressional system which was set up, worked very hard in the whole Congress, has been broken. It's like a tricycle. You have in that tricycle, two repositories and an MRS, and you come before us and say it's broken.

There's only one wheel left, and that wheel is bent because it's out of date. In other words, there's no MRS; there's no second repository. And so you are stating, we've got a unicycle.

And this Senator, and the people that we have are concerned that nobody's going to bring the other parts back, and this is going to have to happen over a long period of time.

So what we're trying to ask at this point is, are you prepared to bring to the Committee and to the Congress as a whole amendments to the Nuclear Waste Policy Act that creates a new system that works.

Secretary HERRINGTON. The answer to the first part, on the MRS and the two repositories, this was fully discussed at Mr. Rusche's confirmation hearing. I read the transcript on the slipped dates, how the program is coming.

It's not as if it is being sprung on you at this point, number one. Number two, this first repository is a viable program. You will get a first repository, unless Congress tells us not to. And you will get a second repository if it's needed, the way we're proceeding today.

Senator ADAMS. But that isn't what the Congress did, Mr. Secretary, is it?

Secretary HERRINGTON. I think it is. I think we're in compliance on this.

Senator ADAMS. The Congress stated, there'd be repository one, repository two, they'd overlap as they are proceeding forward. They are the two wheels on the tricycle.

Secretary HERRINGTON. Well, your tricycle analogy, I think, is way off. Way off.

Senator ADAMS. Well, then, you tell me, because I'll comment in a moment on your president of the board coming to a board of directors.

Because like my senior colleague from the State of Washington, I've served on boards of directors too. And I can tell you what we would have done with a president of a corporation that came in after two years, submitted this, and said, I'm not going to follow the instructions that you had, but I want to do some more. We'd have fired him.

Secretary HERRINGTON. Well, again, if I could correct you, I didn't say I'm not going to do what you told me.

I said, here's what I think works under the Act, in order to get a repository. And that's what Congress wants, is a repository.

This works. It's realistic. Please tell me, board of directors, give me some guidance, Congressional input: Are we doing the right thing? If not, tell us. We'll change.

Senator ADAMS. I think we have had several people tell you this morning, at least from this Committee, that they would prefer you follow the statute that started.

The question I asked you was, if you don't follow the statute, we don't accept the fact of having the Department of Energy create a new statute.

We want, and have asked you the question, are you prepared to come up and say, these are the amendments we need to create a new consensus in the country.

Because Mr. Secretary, I have sat in the position you're in. And once you move beyond the statutory lines, and your consensus begins to break down—and this is not a partisan comment; it is a comment with a small "p"—what occurs is, it gets worse.

As one of my other colleagues said, it doesn't improve itself by more and more explanations and more and more variations. You may need another variation in this.

But you don't have a consensus beneath you for this statute that you say you can't carry out. And you haven't given us amendments for a new statute.

You have, in effect, given us what would be, in my time, a regulation that says, we can't follow the statute so we're going to create a new statute by regulation.

Every time that gets knocked out in the courts. And when that gets knocked out, this whole program grinds to a halt, and all of the work that everybody in this committee has worked on, they'd have to scramble then to amend the act.

What they're really asking you is, shouldn't we be operating on that now? Or isn't this whole program going to be pushed further out into the future, because we have fatally flawed the statutory process.

Secretary HERRINGTON. If we were to open up the Nuclear Waste Policy Act for debate again, and for amendments, to me, that would be the end of the program.

Senator ADAMS. All right, then, you could have followed the act.

Secretary HERRINGTON. The act is the act, and we will follow it, and we will obey the law. I guarantee you that. This is our plan for following the law.

Senator ADAMS. But it doesn't follow it. That's the point.

Secretary HERRINGTON. I think it does.

Senator ADAMS. Well, I just read, and I'm not going to do it again, but I read down the sections, and you hadn't met a single one of them. So I don't know how you're going to follow the law.

Now, I would be very happy if you were to follow the law on wherever you could from this point forward, including coming in under Section 112 small b capital C, and by July 1, 1989, nominate the three additional sites to the President for the selection of a second repository. But you haven't said you're going to do that.

Secretary HERRINGTON. Senator Adams, there has to be some realism here. Senator Evans says we need more cooperation with the State of Washington. We need more time. You're not dealing well.

And we say, we need an extra five years to carry out our relations with the State——

Senator ADAMS. No, no, that's a later question. This one that I asked you is, you have told us you're not going to come up with the selection of the second repository, and that's a flat statutory requirement in Section 112 small b capital C that it be done by July 1st, 1989; and that, carried out, would carry out your promise, made to this Committee, made to the House committee, and made on the floor.

And what I'm saying to you is, if I had the president of a board who was saying he's not going to do what we've told him, hasn't in the past, and is not going to next year, I'd fire him and get somebody who did.

And that's my answer to your hypothetical.

Secretary HERRINGTON. Well, that may be. What I need to say to you is that you would also not be happy—and I was careful not to use the word "president'. It was CEO.

Senator ADAMS. CEO. All right, the CEO.

Secretary HERRINGTON. The chief operating officer of a program as important as this who didn't come to you and say, look, there may be some money waste. There may be some change in the waste projections. I think you ought to look at this.

If this is not accepted or endorsed, or no action is taken on it—let's say no action is taken on this plan, to say we're doing right—and if the money is not appropriated to carry out this plan, we will go back and we will identify your second repository by the timeframes in this act.

Senator ADAMS. What do you mean, if there's no action taken? You haven't got an amendment laid before the Congress, or any congressional action that can correct that act.

But you have told us you're not going to put the second site up on July 1, 1989, as it said in the statute.

Either you are or you aren't.

Secretary HERRINGTON. This law also requires us to submit to Congress a mission plan of what we're doing.

Senator ADAMS. We've got the mission plan.

Secretary HERRINGTON. Here's the mission plan. I assume that Congress put that in the act so they could tell us whether we were going the right direction or the wrong direction, and I hope to get your input on that.

Senator ADAMS. The Congress has stated—I thought I heard it two, three, four times—please follow the statute. We had a lot of trouble passing this. The second repository was a key part of doing that. So carry it out.

Now I picked this one, because it happens to be something that has not happened yet. And you could come forth with that, because it's 1989, but you say in your mission plan, you're not going to do that, either.

So you would not only not——

Senator DOMENICI. Would the Senator yield?

Senator ADAMS. Yes, I would be happy to yield.

Senator DOMENICI. Could I just make an observation?

Mr. Secretary, I really want to state in the record that I think the missed deadlines in the first round were done in good faith, and more or less the committees knew that was happening.

Senator Adams was not here, and I am not critical of his line of questions. But Mr. Secretary, what you are now experiencing is precisely what this Senator from New Mexico told you was going to happen day after day if you expect to significantly change this statute, even though your intentions and your motives are marvelous.

This Senator wants the whole process—the Senator from Washington—of two sites, so we have an east and a west.

Now, my friend, you're going to go to the House, and there's a whole bunch of them who are delighted that you are not going with a second one, because it's in their area.

So they're going to be telling you, that's really good, and we think you're okay. But somebody else is going to be doing the absolute other. And then they're going to go back four years and say, you really ought to be fired before you even got here. Because you've only been here a couple of years.

So it isn't going to work this way, I don't think. And I hope that's what's coming out of this meeting, that you've got to find some way to get a consensus, because there's too diverse a view around here for this to just work on your submitting some plan. And I wish you the very best.

But I think this is precisely, in spades, what is going to happen to you in the next couple months.

The CHAIRMAN. And if the Senator will further yield, I think there is a fundamental difference between trying to meet a target and failing, and saying, we're just not going to do that activity, at least not for the foreseeable future, indefinitely.

We understand the dilemma you're in. We understand the difficulties. And I praise you and I praise Ben Rusche for giving it your very best. We understand that.

But the law, as all of us, I think, here on this Committee, understand it, ought to be attempted to be abided by, including the dates. And we know you're going to miss a lot of those dates.

But you need to try. And I know it means a beehive of opposition when you have to go in and follow the law.

But as long as you're following the law, you've got something not only to hide behind, but something to have a firm foundation on. And the minute you say, well, we're going to slip here because it's a good idea, then it really does become political. Not partisan political, not bad political; but it becomes a political process rather than a legal one. And this ought to be a legal process.

I thank the Senator for yielding.

Senator **ADAMS**. Thank you, Mr. Chairman. Thank you, Mr. Domenici.

I have just two further things to state on that, and then I will yield, because I know other members wish to question.

One, I am concerned, Mr. Secretary, as a person in the United States, and I know that the Chairman is, not just as a Senator, that you continue on your present course and the courts will move in, not just the Congress.

And if this whole process collapses at that point, then your whole program will be junked, and we'll have to start over again anyway, which is something that is going to cause an awful lot of hurt around the country.

So it should not be ad hoc, and it should not come forward with statements that indicate in the future you will violate the act even more.

And I have one other thing that I would like to ask as a final question. And that is, you stated that your department would—or the people in your department would just as soon not have this program.

Would your department and the administration support an amendment that placed the nuclear waste program in another operating agency? Absent that, a review board that gave instructions to your operating people, so that somebody who felt they could do the job would go out and do it.

Secretary **HERRINGTON**. I think that my remark was a poor attempt at being humorous.

You know, we looked before at placing this in an independent agency under prior Secretaries. I think it's probably in the right place, and you've got the right people running it.

Certainly, if we can be more responsive to the States, we need to do that. And that's been one of the major criticisms that we've had.

But I think the vehicle is pretty good. You get a flavor for how tough this is; I'm sure most of the people here today realize that. But I think the program is organizationally pretty good.

Senator **ADAMS**. Thank you, Mr. Chairman.

The **CHAIRMAN**. Senator Sasser, thank you for your patience. You are recognized.

STATEMENT OF HON. JAMES R. SASSER, A U.S. SENATOR FROM THE STATE OF TENNESSEE

Senator **SASSER**. Thank you, Mr. Chairman.

And I want to thank you for the opportunity of appearing here this morning, and thank the members of your committee for their forebearance.

I want to begin, Mr. Chairman, by saying that I firmly believe that my native State of Tennessee has been treated very shabbily by the Department of Energy and by this administration.

We've heard an admonition from the Chairman this morning, echoed by the ranking Member, that we should take politics out of the selection of these repository sites.

I think it's meaningful that both the Chairman and the ranking Member felt it was incumbent upon themselves to make that statement, I suppose to try to clear the air here this morning.

But frankly, I think this whole process is shot through with politics. This administration is playing a political game with the permanent disposal of nuclear waste. They attempted to appeal to their friends in the West in the last election.

They're here before us today to try to seek an additional five years on a permanent repository. And I think by their actions they have drained the Nuclear Waste Act of 1982 of its credibility.

Now, when the Congress passed the Waste Act of 1982, the intent was clear: to provide for a permanent disposal of nuclear waste.

In my view, this administration and the Department of Energy has mishandled and mismanaged their solemn duty that they were charged to perform.

They are back before this committee today saying they want to delay the permanent repository by at least five years. But they're also saying, go ahead and give us the MRS just in case we can't get the permanent disposal program off the ground.

Well, Mr. Chairman, I know what that means, and the people of my state know what it means. It means that the character of the MRS has changed before the first shovel of dirt is turned.

Now, let me ask you this, Mr. Secretary: What is the capacity of the MRS to store nuclear waste; 14,000 tons, isn't it?

Secretary HERRINGTON. 15,000 metric tons.

Senator SASSER. Yes, sir. And it's going to be designed in such a way that it can be expanded to handle up to 70,000 tons, which is the capacity that's being calculated for a permanent repository; isn't that correct?

Secretary HERRINGTON Yes.

Senator SASSER. Yes, sir. So that we see that the primary purpose of the MRS is no longer just a packaging facility. It's going to become under this administration to de factor nuclear waste disposal site, and make no mistake about it, once that MRS is built, the pressure is off for a permanent disposal program.

With waste piling up, and the government committed to taking possession of the private utility's waste, I know what the response is going to be.

The response is going to be, well, we've got an MRS in Oak Ridge, Tennessee, deep in a heavily populated area, one of the most beautiful areas of this country, adjacent to the most heavily travelled area of the country, adjacent to the most popular state park in the country, the Great Smokey Mountains National Park, visited by over 10 million Americans every year, we got this MRS in place; let's go ahead and expand it and make it permanent, because we don't have the wherewithal, the fortitude, to go forward as we've been directed to by this act and put two additional permanent repositories, one in the east and one in the west.

We've already abandoned the concept of a permanent repository in the east; that was a political decision. There's an old saying, if you can't get the east to agree and the west to agree, what do you do? You put it in the middle.

And I think that's what's happening here with this MRS.

So I think, Mr. Chairman, and I think you and your committee members have identified it here this morning, if we give them an additional five years on a permanent repository, we'll be condemning, I think, the permanent disposal program to a decade or two of complete inertia for decision. And we'll be giving this Secretary of Energy the easy way out.

Now, let me just say something on behalf of the 4.2 million citizens of this country that myself and my junior colleague, Senator Gore, represent.

On their behalf, I thoroughly resent the arbitrary manner in which this Department of Energy has gone about the attempt to shove the MRS down the throat of the people of my state.

The State of Tennessee and its elected officials and those who serve its people have expressed their convictions about the MRS overwhelmingly. The state legislature passed a unanimous resolution against the proposal. The governor made it clear the state intends to issue a resolution of disapproval.

The State Attorney General has filed suit against the MRS site, and the location procedure that was used, and that is now tied up in the Federal courts.

But I think it becomes increasingly clear the Department of Energy intends, by sheer force, to attempt to force this MRS, which will become a de facto permanent repository, down the throats of the people of the State of Tennessee.

Now the Secretary indicated this morning that there had been some failures in working with the states; they needed to do a better job in dealing with the states.

But what the Department of Energy has done in my state is to totally alienate its citizens. They have destroyed much of the good will which has developed over the years between Tennesseans and the nuclear power industry.

And I think those members of this audience who represent the private nuclear power industry ought to take cognizance of that fact.

Their efforts to inform the citizens of Tennessee—that is, DOE's efforts—to advise and to counsel with them about this MRS, have been so amateurish and so insignificant as to be almost laughable, were it not such a critical matter.

So, Mr. Chairman, I think that unless this Department of Energy is directed to go back to the drawing board and start this selection process all over, and the monitored retrievable storage site, I'm not going to have any option except to oppose it in every legal way possible.

My own view on the MRS is that it's not necessary for a viable waste program. The General Accounting Office has done a study which indicates that half the nation's utilities agree with that statement.

I know that the Federal Government has got a contractual obligation to begin taking the waste by 1998. But we don't need an MRS to accomplish that commitment.

The Federal Government can take possession of the waste at the reactor. And they can restack them there until the permanent repositories are completed and ready for fill.

But why can't they package the wastes at the reactor, rather than shipping it to an MRS and then on to a final repository, as we're told they're going to do.

I think the distinguished junior Senator's analogy of a tricycle is very accurate. The tricycle has lost two wheels, and it's now a unicycle, and it's going to stay a unicycle.

And that major unicycle wheel is going to be right in Oak Ridge, Tennessee.

Now, I know that the Chairman and perhaps the majority of the members of this committee, believe that an MRS Is necessary. I'm going to do everything in my power to influence the Senate that the Chairman and the Members of this committee are incorrect in that respect.

But in the event that I should fail, I want to ask this Committee's help in returning some measure of equity to the MRS selection process.

I would recommend that the Committee consider directing that the Department of Energy go back and start the selection process for the MRS all over again. If we can consider delaying a permanent repository for an additional five years, we can certainly delay an MRS for a year or two.

Instead of the Federal Government going to Tennessee or any other state and saying, you're going to be the site for the MRS, why can't the Department of Energy go out and ask for bids? Issue a request for proposals for the MRS? The Secretary himself, Mr. Herrington, you indicated this morning, in your opening statement, that this might be an attractive proposition, an attractive proposal.

And there could be states which would accept these permanent repositories or even an MRS for the jobs that they create.

So I think we'd be better advised here to go back to the drawing board. And if the MRS is such a good idea, if the country needs it, then I would say this administration ought not to have any problem in selling that to one state.

If this administration has one strength, it is in the field of marketing. They have marketed to this country some ideas that I thought were absolutely unmarketable. And if they can do that, I think they can certainly—certainly have the ability to market an MRS and put it in a place where it ought to be, if one is needed, and I doubt that very seriously.

So, Mr. Chairman, I would hope that today the Department of Energy could go back and get to work and build a constituency for an MRS or a permanent repository in any other state, if they believe that an MRS is necessary.

Let me ask you this, Mr. Secretary, you said in your opening statement that you were of the opinion that it might be possible to convince a state, based on the benefits that the repository or the MRS would bring to their state, you might be able to persuade a state to accept it willingly.

Wouldn't that be a better approach than going through this period of fighting it out in the courts, fighting it out here in the United States Senate and the House of Representatives, fighting it out with governors and the state legislatures, generating all types of ill will for the Department of Energy, the Federal Government, the nuclear industry?

What's wrong with going back and trying to resell this idea?

Secretary **HERRINGTON** I think going back is a mistake. Certainly your suggestion is a better way to proceed; if you could do this on an agreeable basis, it would be the right way to do it.

Nobody, I think, enjoys the process the way it is right now. But I just don't see it——

Senator **SASSER**. Well, why didn't we do it that way, Mr. Secretary?

Secretary **HERRINGTON**. I don't see it in the cards right now. The act requires certain things, and we've come forward as best we can under the act.

And I don't see the voluntary solution.

Senator **SASSER**. The act does not require an MRS; we're agreed on that. What the act does require is that the Department of Energy make a study, and then make a recommendation back to the Congress of the United States.

You made a study. You came up with three sites all in one state. All in mine and Senator Gore's state. And there was no effort to go to other states and see if perhaps they might have an interest in this matter, an interest in the MRS.

We have no interest in it. We don't want it. But you might be able to sell it someplace else. Why wasn't that done?

Secretary **HERRINGTON**. I think we did consider other States.

Senator **SASSER**. Well, the only three sites I ever heard mentioned were Oak Ridge, Tennessee; Hartsville, Tennessee; and there's one other state, also another site in Oak Ridge, Tennessee.

Secretary **HERRINGTON**. I think we had 11 sites. I'm not sure they were all public.

Senator **SASSER**. Well, the only three you've recommended to this Congress—you're recommending Oak Ridge, and the only three, when you got down to the final round, the only three that were there were three in the State of Tennessee. That's correct.

Mr. Rusche knows that's correct.

Secretary **HERRINGTON**. Yes, that is correct.

Senator **SASSER** Why wasn't an effort made to try to sell the MRS someplace else?

Mr. **RUSCHE**. Senator, in the site selection consideration, we did consider 11 sites, in I believe five states. We selected the three, as we have had the opportunity to discuss before, for a number of reasons, which are very specifically pointed out in the siting study.

You have not seen that formally, because the proposal has not been up here. You have not seen the proposal formally as a matter of fact. But that siting study does indeed consider other states.

We did not attempt to conduct a marketing effort in any of the states. And as you indicated, in Tennessee we might have been unsuccessful.

Senator **SASSER**. Well, you might have been successful, also, Mr. Rusche, if you approached it in a different way. But I think that die is cast now. That genie is out of the bottle. We don't want the MRS in the State of Tennessee.

And I think we're seeing here, Mr. Chairman, in the selection of this MRS, the same type of political considerations that you cautioned the Secretary against in your opening statement.

Three sites in the State of Tennessee. They were, in my judgment, selected because that was a means of isolating the political opposition.

If you've just got the sites in one state, then you've only got to deal with the congressional delegation from that particular state.

I think that's the reason that there were three sites in the State of Tennessee.

Well, Mr. Chairman, I've gone on here at great length, and you've been kind enough or hospitable enough to allow me to appear here this morning before your Committee. And I want to express my appreciation to you for that.

The CHAIRMAN. Thank you, Senator Sasser. And I might add that Mr. Rusche will testify, when?, on February the 5th.

I'd like to invite you back at that time, and I think he will be able to go into more detail on how the sites were selected and how they were selected.

And I think the committee is going to be very interested in that, and I know you will be as well.

Finally, Mr. Secretary, I know you're going to have to leave soon, but we have one further Senator whom we welcome to the committee and also want to invite back for further meetings on this subject, Senator Gore from Tennessee.

STATEMENT OF HON. ALBERT GORE, JR., A U.S. SENATOR FROM THE STATE OF TENNESSEE

Senator GORE. Mr. Chairman, thank you very much for your extreme courtesy in affording Senator Sasser and Senator Adams and I the opportunity to participate so fully in your proceedings today.

I will keep my comments and questions to a minimum because my senior colleague from Tennessee has done a very able job of articulating the concerns felt by citizens of our state, and has touched upon most of the important questions which I feel remain inadequately answered.

But I would like to make a few points with your permission.

First of all, I understand that others during the proceeding today have made the point, Mr. Secretary, that you have acted illegally in eliminating consideration of a second repository, and in delaying the timetable for five years.

Is it your position that you're above the law?

Secretary HERRINGTON. That is absolutely ridiculous. I'm a lawyer. I practiced 30 years. We are subject to the law and Congress, and that is not a serious question.

Senator GORE. Well, with all due respect, there were lawyers involved in this administration in the decision to sell weapons to terrorists. They knew that was against the law, but they decided they were above the law.

Secretary HERRINGTON. Well, that's not a——

Senator GORE. There were lawyers involved in the decision to illegally divert the profits to the contras. They knew that was against the law, but they did it anyway.

I think you know it's against the law for you to unilaterally ignore the mandate to go forward with the permanent repositories.

It's against the law for you to unilaterally remove consideration of an eastern repository. And I think you just decided that your own personal views, and the views of the bureaucrats in your department are more important than the laws duly passed by this Congress representing the American people and signed by the President, enacted under the authority of the Constitution.

You're putting your own personal views in a place that's more important than due process.

Secretary HERRINGTON. Senator Gore, that's insulting. It has no place in this hearing.

Senator GORE. Why have you violated the law?

Secretary HERRINGTON. I have not violated the law.

Senator GORE. How do you explain your actions, then? The law seems pretty clear.

Let me phrase it another way. Where do you believe that you get the legal authority to unilaterally eliminate consideration of a second repository, and unilaterally extend the deadline by five years?

Tell me the legal source of that authority.

Secretary HERRINGTON. You weren't here during the prior hearing, but there was a discussion of this all along, how deadlines have slipped, how it was brought up——

Senator GORE. I don't want to hear about deadlines slipping. I want to know, where is the legal authority? Tell me.

Secretary HERRINGTON. For what?

Senator GORE. For you taking the unilateral actions you've taken.

Let's deal first with elimination of consideration of a second repository. What is your legal authority?

Secretary HERRINGTON. That is patently wrong. On page 11 of this draft, it says we are committed to a second repository.

You've used the words cancel, elimination; those simply are not factually correct.

Senator GORE. Are you searching for an eastern repository right now?

Secretary HERRINGTON. We are using non-site-specific work on an eastern repository. It has not been cancelled. I said we would like to delay the decision to the mid-1990s.

Senator GORE. Where is your legal authority for delaying the decision until the mid-1990s?

Secretary HERRINGTON. We have said in our draft Mission Plan amendment this is the proper course of action, and we are asking input from Congress to tell us that this is the right way to proceed.

If you don't tell us this is the right way to proceed, there has been no prejudice to this program, and we can go and get the second repository.

Senator GORE. So you're citing your mission plan as the legal authority?

Secretary HERRINGTON. Yes, if you approve the draft Mission Plan amendment, which it requires in the statute——

Senator GORE. In other words, you can't do it unless we tell you you can?

Secretary HERRINGTON. If this draft Mission Plan amendment is not approved by Congress, or if you don't appropriate the money that implements this plan, we're not proceeding on it.

Senator GORE. Aren't you obligated by the President's oath of office to faithfully execute the laws as passed by the Congress?

Secretary HERRINGTON. Absolutely; and we are doing that.

Senator GORE. You're not faithfully executing the laws if you're stopping all site-specific exploration for an eastern repository; it's just that simple.

Secretary HERRINGTON. Well, we disagree. And the lawyers have looked at this. I mean, it's a legal question. And legal questions have no answers. [Laughter.]

Senator GORE. You know, that's the kind of arrogant approach that this administration has taken to a lot of questions, assuming that legal questions don't have any answers.

You know, legal questions occasionally do have answers. The law is clear in this respect, and you've decided to ignore it. And you're trying to fuzz it over and pretend that you're following the law, when actually you are not following the law.

Secretary HERRINGTON. Senator Gore, first of all, I have worked with you a lot, and I'm not an arrogant person. I'm attempting to manage what I think is a very difficult law to bring a waste repository to the country.

And we're using good efforts. And we have a lot of people, not only in Oak Ridge, but in this Department that are working very hard.

And Senator Sasser says we've acted illegally and everything else.

Senator GORE. So has the Chairman, if I'm not mistaken.

Secretary HERRINGTON. The intent is to follow the will of Congress in this.

Senator GORE. I mean, the Chairman has also said that, if I'm not mistaken.

Secretary HERRINGTON. Well, the Sixth Circuit Court in your state says we've done a good job. It's on appeal. This is a difficult question.

Senator GORE. That's a different point. That's a completely different point, isn't it?

Secretary HERRINGTON. Yes, it is.

Senator GORE. All right.

Secretary HERRINGTON. But it involves the same question.

Senator GORE. Well, no, it doesn't, with all due respect. It involves a completely different point.

Now, your mission statement, your mission plan, which you have cited, says that an MRS facility added to a single repository system does provide some of the benefits to be obtained by adding a second repository at a very early date; correct?

Secretary HERRINGTON. Correct.

Senator GORE. Were the benefits of the MRS originally calculated on the assumption that there would be two permanent repositories?

Secretary HERRINGTON. Yes.

Senator GORE. So some of the benefits asserted for the MRS would be lost if there was not a second permanent repository; correct? You say some of them would be retained if there's only one permanent repository. Would some of them be lost?

Mr. RUSCHE. Senator, I believe the point you're referring to is the operation of an additional facility, whether MRS or second repository, early, has certain benefits.

And for that reason, it does not matter which one we're talking about. To that extent, either serves the purpose, and that's the intent of that statement.

Senator GORE. Now, you are saying that Tennesseans should not feel concerned about the possibility that the MRS would become a de facto permanent site because you're proposing that the Congress enact a legal linkage between the licensing of the MRS and the site selection for the permanent repository; correct?

Secretary HERRINGTON. Yes.

Senator GORE. Now, are you proposing a linkage between the construction of an MRS and the siting of a permanent repository? Or the licensing of an MRS?

Mr. RUSCHE. I think we would propose in the formal version, if we ever get it to you, that an MRS may not operate until we have a construction authorization for a first repository, or a repository from the NRC.

That's what we would propose.

Senator GORE. All right, now, so if your plan was adopted, we would spend all this money to create an MRS. We would prepare the site, put the structures up, put everything in place, get the transportation network all ready to operate, load the waste on the trucks, get them right up to the gate of the MRS, and then say, wait a minute. They can't go inside the gate until there's authorization for a permanent repository.

Meanwhile, if you come in with another unilateral five-year extension on the permanent repository, if the political opposition in those permanent repository states makes it difficult for you to carry through that plan, what position are we in then?

Here's a row of trucks filled with waste. The horns are honking, Mr. Secretary. Let us in! Let us in! Horns are honking. Everything's ready. They've got the key in the gate, ready to open the gate. And the utilities are loading more trucks. And they're backing up on the highway.

And you're telling them, wait a minute. There's a legal linkage between the—but they're saying, Washington and Texas and Nevada, they're climbing the walls out there. We're not getting any closer to a permanent repository.

You're telling me that under those circumstances we're supposed to have any confidence at all in this administration and the fact that it would not come to the Congress and say, let us turn that key. Let's go ahead and let them in.

You know, that's exactly what would happen, isn't it? Realistically speaking?

Mr. RUSCHE. Senator, I don't believe we would be quite that short-sighted with respect to loading the trucks. [Laughter.] I think the Senator will recall that I have the opportunity, as does the Secretary, to visit with you several times a year for the benefit of guidance in the program.

And I would presume that if the sort of hypothetical situation you suggest wasn't pending, that you and other Members of the Congress would provide appropriate guidance in the intervening ten years between now and then.

Senator GORE. Oh, you'd get guidance from two out of 100 Senators, I guarantee you. And we'd have some others who agreed with us.

But two out of 100 Senators, under those circumstances, with the facility all built, ready to get the waste, waste ready to come, you know, that's not a realistic pledge.

Let me say this. I know that you have to leave, Mr. Secretary, and the Chairman properly wants to be courteous in meeting your timetable.

I also want to help him in that regard. I'd like just to conclude very briefly by saying that I do believe that you have acted beyond the law. I do believe you've made a terrible mistake.

And you are going to have one whale of a fight on your hands. In fact, a lot of other states may not feel the way Tennessee does. But we're going to marshall all the resources we can, and we're going to fight you down to the very last.

And we're going to do our best to win. And the fact that, in my opinion, you've broken the law, and in the process, effected the analysis of an MRS in the first place, strengthens our hand.

So we're going to be doing our best to stop you at every point along the way.

Thank you very much, Mr. Chairman, for your courtesy.

The CHAIRMAN. Thank you, Senator Gore.

Thank you, Mr. Secretary. I know you're bumping on the underside of your meeting at the White House. You've been very generous with your time.

We would like to have you back, and I know Mr. Rusche will be back on February the 5th, and we'd like to invite back our friends from Washington and Tennessee at that time so that they may again participate.

Thank you very much.

[Whereupon, at 1:32 p.m., the hearing recessed, to reconvene Wednesday, February 4, 1987.]

NUCLEAR WASTE PROGRAM

WEDNESDAY, FEBRUARY 4, 1987

U.S. SENATE,
COMMITTEE ON ENERGY AND NATURAL RESOURCES,
Washington, DC.

The committee met, pursuant to notice, at 9:35 a.m., in room SD-366, Dirksen Senate Office Building, Hon. J. Bennett Johnston, chairman, presiding.

OPENING STATEMENT OF HON. J. BENNETT JOHNSTON, A U.S. SENATOR FROM THE STATE OF LOUISIANA

The CHAIRMAN. The hearing will come to order.

I want to welcome all of our guests here. Today the full committee is holding the second in a series of hearings on the implementation of the Nuclear Waste Policy Act of 1982 by the Department of Energy.

At this hearing we will hear from the States and Indian Tribes affected by the Department's selection of geologic repository sites in Washington, Nevada, and Texas.

The purpose of this hearing is to offer these States and Tribes an opportunity to make a record of their concerns with the Department's implementation of this program. I would urge each witness to be specific as to the problems that he or she believes exist.

We already know, and indeed we had a hearing here, about the question of the failure to site a second repository in the Northeast.

I stated here at the hearing throughout the long, four-hour hearing, that in my judgment that was illegal, improper, and violated the law. I think every member of this Committee repeated the same theme. So I would say to our witnesses, we need not be convinced and repeat what we took about four hours to do. We are still convinced that the Department should have, and under the law must, site a second repository—we call it an Eastern repository, although it is not so designated as I recall under the law—in any event, a second repository. So we need not deal with that issue.

What we would like is testimony as to the following:

What is wrong with the technical process DOE has been following in the program for siting the first repository?

Has DOE been ignoring requirements of the Act in its examination of the first round repository sites? Which specific requirements have been ignored or poorly carried out?

Is the Act itself flawed in the way it sets out the first repository program? If so, how specifically is it flawed?

Do the witnesses believe that there is scientific evidence about these sites that DOE is ignoring? What evidence?

Are there conditions at any of these sites that make the site so obviously unsuitable for nuclear waste disposal that DOE has no business selecting the site for characterization? What are these conditions?

Has the DOE failed to carry out its responsibility under the Act to consult and cooperate with the States and the Tribes?

[The prepared statements of Senators Johnston, McClure, Hecht, and Bentsen follow:]

STATEMENT OF SENATOR J. BENNETT JOHNSTON

CHAIRMAN, COMMITTEE ON ENERGY AND NATURAL RESOURCES

HEARING ON CIVILIAN NUCLEAR WASTE MANAGEMENT
FEBRUARY 4, 1987

TODAY THE FULL COMMITTEE IS HOLDING THE SECOND IN A SERIES OF HEARINGS ON THE IMPLEMENTATION OF THE NUCLEAR WASTE POLICY ACT OF 1982 BY THE DEPARTMENT OF ENERGY. AT THIS HEARING WE WILL HEAR FROM THE STATES AND INDIAN TRIBES AFFECTED BY THE DEPARTMENT'S SELECTION OF GEOLOGIC REPOSITORY SITES IN WASHINGTON, NEVADA AND TEXAS.

THE PURPOSE OF THIS HEARING IS TO OFFER THESE STATES AND TRIBES AN OPPORTUNITY TO MAKE A RECORD OF THEIR CONCERNS WITH THE DEPARTMENT'S IMPLEMENTATION OF THE PROGRAM. I WOULD URGE EACH WITNESS TO BE SPECIFIC AS TO THE PROBLEMS THAT HE OR SHE BELIEVES EXIST.

WE ALREADY KNOW - AND I TRUST THAT THE SECRETARY OF ENERGY ALSO KNOWS - THAT PEOPLE ARE UNHAPPY WITH THE DECISION TO INDEFINITELY POSTPONE SITE-SPECIFIC WORK ON A SECOND REPOSITORY. WE ALREADY KNOW THAT SOME PEOPLE THINK THAT DECISION WAS ILLEGAL. WHAT WE WANT IN THIS HEARING IS TO FOCUS ON THE PROCESS FOR SITING THE FIRST REPOSITORY: THE TECHNICAL PROCESS AND THE INSTITUTIONAL PROCESS.

FOR EXAMPLE:

-- WHAT IS WRONG WITH THE TECHNICAL PROCESS DOE HAS BEEN FOLLOWING IN THE PROGRAM FOR SITING THE FIRST REPOSITORY?

-- HAS DOE BEEN IGNORING REQUIREMENTS OF THE ACT IN ITS EXAMINATION OF THE FIRST ROUND REPOSITORY SITES? WHICH SPECIFIC REQUIREMENTS HAVE BEEN IGNORED OR POORLY CARRRIED OUT?

-- IS THE ACT ITSELF FLAWED IN THE WAY IT SETS OUT THE FIRST REPOSITORY PROGRAM? IF SO HOW, SPECIFICALLY, IS IT FLAWED?

-- DO THE WITNESSES BELIEVE THAT THERE IS SCIENTIFIC EVIDENCE ABOUT THESE SITES THAT DOE IS IGNORING? WHAT EVIDENCE?

-- ARE THERE CONDITIONS AT ANY OF THESE SITES THAT MAKE THE SITE SO OBVIOUSLY UNSUITABLE FOR NUCLEAR WASTE DISPOSAL THAT DOE HAS NO BUSINESS SELECTING THE SITE FOR CHARACTERIZATION? WHAT ARE THESE CONDITIONS?

-- HAS DOE FAILED TO CARRY OUT ITS RESPONSIBILITY UNDER THE ACT TO CONSULT AND COOPERATE WITH THE STATES AND TRIBES?

HOW HAS DOE FAILED IN THIS RESPECT? IS THE ACT AT FAULT, IS DOE AT FAULT, OR IT IS SOME COMBINATION OF BOTH.

CONGRESS HAS SOME HARD JUDGEMENTS TO MAKE ABOUT THIS PROGRAM. IT WILL VERY MUCH ASSIST US IF WE CAN DETERMINE WHERE THIS PROGRAM IS FAILING. SOME SEEM TO BELIEVE THAT NO PROGRAM OF THIS KIND COULD POSSIBLY SUCCEED. IF THAT IS THE CASE, WE NEED TO KNOW IT.

BUT I HAVE HAD THE IMPRESSION THAT THE STATES AND TRIBES PRETTY MUCH ACCEPTED THE NUCLEAR WASTE POLICY ACT OF 1982. IF THEY DO NOT ACCEPT IT NOW, THIS IS THE PLACE TO CORRECT THE RECORD.

ON THE OTHER HAND, IF THE ACT IS GOOD LAW, BUT THE IMPLEMENTATION OF THE ACT HAS BEEN FLAWED, WE NEED TO KNOW HOW TO FIX UP THE IMPLEMENTATION. WE WILL HAVE BEN RUSCHE, THE DIRECTOR OF THE PROGRAM, HERE TOMORROW. WE CAN TAKE UP POINTS ABOUT IMPLEMENTATION WITH HIM THEN, AND, BELIEVE ME, WE WILL.

IF A PROCESS LEADING TO ENVIRONMENTALLY ACCEPTABLE DISPOSAL OF NUCLEAR WASTE IS TO BE RE-STARTED, WE NEED VERY MUCH TO KNOW IN DETAIL WHAT IS WRONG WITH THE ONE WE HAVE. THE WITNESSES TODAY ARE THE PRIMARY CRITICS. IT IS UP TO THEM TO MAKE THEIR CASE.

OPENING STATEMENT OF
SENATOR JAMES A. McCLURE
FEBRUARY 4, 1987, HEARING ON DOE'S NUCLEAR WASTE PROGRAM

This is not the first time--nor is it by any means the last time--that this Committee is presented with testimony by those States and Indian tribes most closely affected by the programs and decisions of the Office of Civlian Radioactive Waste Management within the Department of Energy.

We've already had an opportunity to listen to the comments of Secretary Herrington concerning the significant changes that DOE proposes to make to its Mission Plan. And we had the opportunity at that hearing last week to offer our opinions, advice, and criticisms with respect to those changes. We will have the opportunity to further interrogate Mr. Rusche when he appears before us tomorrow.

But as many of you in the audience--as well as many of us here at the dias--may be asking, the pertinent questions seem to be, "What do we expect to get out of all of this?", "What will Congress ultimately do as a result of these hearings?", and "Where do we go from here?".

I feel quite sure that none of us yet have the answers to these questions. Nor do I have any illusions that the answers will come easily.

But I can at least hope that these hearings will provide some substantive food for thought. I can hope that, rather than digressing into shouting matches or deteriorating into politically motivated "media events", these hearings will provide a forum for constructive criticism, and, more importantly, MEANINGFUL PROPOSALS ON OUR BEST MEANS OF CIRCUMVENTING A COMPLETE COLLAPSE OF ALL THE EFFORTS THAT HAVE GONE INTO THIS PROGRAM SO FAR.

I REMAIN, AS ALWAYS, COMMITTED TO THE BELIEF THAT THIS COUNTRY CAN AND WILL SAFELY DISPOSE OF ITS HIGH LEVEL NUCLEAR WASTES. I AM STILL CONVINCED THAT THE FOUNDATION LAID OUT IN THE NUCLEAR WASTE POLICY ACT OF 1982 IS THE BEST MEANS OF ATTAINING THAT GOAL. BUT I AM NEVERTHELESS OPEN TO WHATEVER SUGGESTIONS YOU MAY HAVE ON HOW TO REPAIR SOME OF THE DAMAGE WE HAVE EXPERIENCED ALONG THE DIFFICULT ROAD FROM THE CREATION OF THE LAW TO ITS ULTIMATE AND SUCCESSFUL IMPLEMENTATION.

STATEMENT OF SENATOR HECHT

Mr. Chairman, I would like to thank you for holding this hearing today on the nation's high level nuclear waste disposal program.

I would like to welcome Nevada's former governor, Grant Sawyer, who is here today to testify before the Committee. Grant is Chairman of the Nevada Commission on Nuclear Projects, which is charged with furthering Nevada's interests on the nuclear waste issue.

Last week the Committee heard from Energy Secretary Herrington on this issue, and tomorrow we will be once again be interacting with the Department. A lot has happened in the last year, but very little of it has been to Nevada's liking.

I do believe we can claim a victory in two areas, although there is still much to be done. Last week the Energy Department finally made it clear that they will obey the law and support a second repository. Now we have to convince the Department that they should work on that repository according to the schedule required by the law.

Secondly, and this is particularly significant from Nevada's perspective, Energy Secretary Herrington sat in front of us last week and agreed that I was right last year when I argued that we need to investigate any technical relationship between the necessary and continued nuclear testing at the Nevada Test Site, and the location of a possible repository a mere fifteen miles away. If the weapons tests are going to cause manmade earthquakes around a waste repository, we better know about it before we build the repository.

Finally, the Department has recognized that things aren't going quite the way it planned, and so has recommended significant changes in the schedule for its work.

I am pleased to have played a part in encouraging the Energy Department to face the reality of the situation the entire nation is facing on the nuclear waste issue. I hope, Mr. Chairman, that under your leadership this Committee will be able to find a way to straighten out what so far looks like an unsuccessful program.

STATEMENT OF THE HONORABLE LLOYD BENTSEN

BEFORE THE COMMITTEE ON ENERGY AND NATURAL RESOURCES OF THE UNITED STATES SENATE

RESPECTING THE DEPARTMENT OF ENERGY'S IMPLEMENTATION OF THE NUCLEAR WASTE POLICY ACT

FEBRUARY 4, 1987

MR. CHAIRMAN AND MEMBERS OF THE COMMITTEE:

I AM PLEASED TO HAVE THIS OPPORTUNITY TO APPEAR BEFORE YOU TODAY TO VOICE MY VIEWS ABOUT THE MANNER IN WHICH THE DEPARTMENT OF ENERGY HAS UNDERTAKEN TO IMPLEMENT IMPORTANT PROVISIONS OF THE NUCLEAR WASTE POLICY ACT. AS YOU KNOW, MR. CHAIRMAN, I HAVE WRITTEN YOU A LETTER IN YOUR CAPACITY AS CHAIRMAN OF THE SUBCOMMITTEE ON ENERGY AND WATER DEVELOPMENT OF THE COMMITTEE ON APPROPRIATIONS URGING THE SUBCOMMITTEE NOT TO APPROVE AN ADDITIONAL $79 MILLION IN FUNDING FOR THE DEPARTMENT OF ENERGY'S CIVILIAN RADIOACTIVE WASTE MANAGEMENT PROGRAM. I WILL BE HAPPY TO MAKE COPIES OF THAT LETTER AVAILABLE TO THE MEMBERS OF THIS COMMITTEE.

I WOULD LIKE TO MAKE IT CLEAR AT THE OUTSET THAT MY OBJECTION TO THE WAY IN WHICH DOE HAS MANAGED THE NUCLEAR WASTE PROGRAM IS NOT INTENDED TO BE OBSTRUCTIONIST; IT DOES NOT PERTAIN TO POLITICAL JOCKEYING ON MY PART TO AVOID TEXAS BEING SELECTED AS THE SITE FOR A NUCLEAR WASTE DUMP. RATHER, MR. CHAIRMAN, I OBJECT TO THE WAY DOE HAS PROCEEDED ON THIS ISSUE OUT OF AN ABIDING RESPECT FOR THE CAREFULLY CRAFTED PROVISIONS IN THE NUCLEAR WASTE POLICY ACT WHICH YOU, MR. CHAIRMAN, AND SEVERAL MEMBERS OF THIS COMMITTEE, WORKED HARD TO GET ENACTED SOME YEARS AGO. THAT IS TO SAY, MR. CHAIRMAN, THE WAY I SEE IT, DOE HAS SO POLITICIZED THIS ISSUE AND ALIENATED SO MANY OF THE PARTIES THAT ARE ESSENTIAL TO THE EFFECTIVE IMPLEMENTATION OF THE CIVILIAN NUCLEAR WASTE PROGRAM THAT I HAVE SERIOUS DOUBTS WHETHER IT CONTINUES TO ENJOY THE CONFIDENCE OF THE CONGRESS IN THE WAY IT IS PROCEEDING. ALSO, AND PERHAPS THE MOST PRESSING CONCERN, I AM OF THE VIEW THAT DOE IS DELIBERATELY IGNORING THE WILL OF CONGRESS IN ITS IMPLEMENTATION OF THE ACT. IN THIS REGARD, I WOULD LIKE TO FOCUS ON TWO ISSUES TODAY THAT DEMONSTRATE DOE'S APPARENT INSOUCIANCE WITH RESPECT TO FOLLOWING THE EXPRESS DICTATES OF THE NUCLEAR WASTE POLICY ACT: (1) DOE'S UNILATERAL, UNAUTHORIZED POSTPONEMENT OF THE SEARCH FOR A SECOND REPOSITORY AND (2) ITS FAILURE TO CONSULT MORE CLOSELY WITH THE AFFECTED STATES DURING SITE CHARACTERIZATION ACTIVITIES.

IN ITS DRAFT MISSION PLAN SENT TO CONGRESS AND THE AFFECTED PARTIES LAST WEEK, DOE MEMORIALIZES ITS INTENT TO DELAY THE SEARCH FOR A SITE FOR THE SECOND REPOSITORY. THE SECRETARY ANNOUNCED DOE'S INTENTION ON THIS ISSUE LAST MAY 28TH. WHEN THE SECRETARY MADE THIS ANNOUNCEMENT LAST MAY, I WAS STUNNED. THE EMBALMMENT OF THIS DECISION IN THE DRAFT MISSION PLAN DOES NOT INSPIRE CONFIDENCE IN DOE'S ABILITY TO RUN THIS IMPORTANT NATIONAL PROGRAM. THE REASONS PROFFERED BY DOE FOR DELAYING THE SEARCH FOR A SECOND SITE ARE REALLY NOT REASONS AT ALL. WHAT THEY REPRESENT IS A POST-HOC RATIONALIZATION FOR DISREGARDING THE LAW. MOST OF THE REASONS DO NOT CARRY MUCH WEIGHT. FOR EXAMPLE, DOE SAYS THAT DELAY IS NECESSARY BECAUSE OF ITS PROGRESS IN SITING THE FIRST REPOSITORY AND IS CONFIDENT IN THE SUITABILITY OF THE SITES SELECTED FOR THE FIRST REPOSITORY. WELL, I AM VERY HAPPY THAT DOE HAS REAFFIRMED ITS CONFIDENCE IN THE SITES IT CHOSE; I, AS WELL AS THIS COMMITTEE, WOULD BE VERY CONCERNED IF DOE ITSELF NOW DOUBTED THE WISDOM OF ITS SITE SELECTIONS. BUT THIS IS NO REASON AT ALL TO STOP PROCEEDING ON A SECOND SITE. ALL THIS INDICATES IS THAT DOE IS FULFILLING A PORTION OF ITS RESPONSIBILITIES UNDER THE ACT.

DOE ALSO SAYS THAT POSTPONEMENT IS NECESSARY BECAUSE OF "PRUDENT FISCAL MANAGEMENT AND RESPONSIBILITY". I HAVE TRIED TO UNDERSTAND THIS ONE, BUT ITS MEANING ESCAPES ME. DOES DOE MEAN TO SUGGEST THAT PRUDENT FISCAL MANAGEMENT IS HAMPERED IF IT FOLLOWS THE PROVISIONS OF THE LAW? IF SO, I WOULD THINK THAT A BETTER COURSE FOR THE DEPARTMENT TO FOLLOW IS TO PROPOSE LEGISLATION TO CONGRESS SPECIFICALLY ASKING US TO REEVALUATE THE NEED FOR A SECOND SITE OR TO REVISE THE STATUTORY SCHEDULE -- A MEASURE I PROPOSED LAST YEAR -- NOT TO ABANDON THE SEARCH WITHOUT AN EFFORT TO COMPLY WITH THE ACT.

FINALLY, I NOTE WITH INTEREST AND CURIOSITY DOE'S ASSERTION THAT THE SEARCH FOR THE SECOND SITE SHOULD BE POSTPONED BECAUSE "FORECASTS OF THE QUANTITIES AND RATES AT WHICH SPENT FUEL WILL BE DISCHARGED FROM REACTORS" ARE DECLINING. I SUBMIT THAT IN ENACTING THE ACT CONGRESS WAS WELL AWARE OF THE FLUCTUATIONS IN FORECASTS THAT WOULD OCCUR ON THE AMOUNT OF SPENT FUEL DISCHARGED FROM REACTORS. THIS MATTER WAS FULLY CONSIDERED. THE PROBABILITY THAT FLUCTUATIONS WOULD OCCUR DID NOT PREVENT CONGRESS FROM ENACTING THE REQUIREMENT THAT A SECOND SITE BE IDENTIFIED, AND IT IS NOT A REASON TO ABANDON THE PROVISION IN THE ACT REQUIRING DOE TO IDENTIFY THE SECOND SITE.

DOE'S FAILURE TO FOLLOW THE LAW ON THIS POINT IS MADE ALL THE MORE TROUBLING IN LIGHT OF ITS RECOGNITION THAT A SECOND REPOSITORY IS NEEDED. INDEED, THE SECRETARY HAS TESTIFIED THAT "EVEN THE LOWEST CURRENT PROJECTIONS OF SPENT FUEL GENERATION INDICATE THAT THE SECOND REPOSITORY WILL BE NEEDED." IN LIGHT OF THE CLEAR ACKN~~OW~~LEDGEMENT BY DOE THAT A SECOND REPOSITORY IS NEEDED -- SOMETHING THAT CONGRESS WAS NOT IN ANY DOUBT ABOUT, EVER -- I SIMPLY DO NOT UNDERSTAND WHY THE SEARCH HAS BEEN POSTPONED. AND I MIGHT ADD THAT THIS POSTPONEMENT IS FOR AN "INDEFINITE" PERIOD OF TIME WITH NO INDICATION FROM DOE AS TO HOW LONG IT IS TO LAST. THIS DECISION HAS NO BASIS IN LAW; IT IS TOO VAGUE; AND IT DOES NOT PROVIDE SUFFICIENT CLARITY TO CONGRESS FOR IT TO CONTINUE TO APPROVE FUNDING FOR THE NUCLEAR WASTE PROGRAM. THUS, I SUBMIT, DOE MUST BE HELD ACCOUNTABLE FOR ITS ACTION.

ON THE ISSUE OF CONSULTING WITH THE STATES, AT LEAST INSOFAR AS TEXAS IS CONCERNED, DOE IS CLEAR AND UNEQUIVOCAL THAT IT HAS HAD INSUFFICIENT CONTACT WITH TEXAS OFFICIALS. THE DRAFT MISSION PLAN RECASTS THE RESPONSIBILITY FOR CONSULTATION AND COOPERATION BY STATING SIMPLY THAT TEXAS HAS NOT REQUESTED C & C NEGOTIATIONS. MR. CHAIRMAN, I RESPECTFULLY SUBMIT THAT DOE HAS GOT TO DO BETTER THAN THAT.

THE CIVILIAN RADIOACTIVE NUCLEAR WASTE PROGRAM IS HIGHLY CONTROVERSIAL AND ITS SAFE AND EFFECTIVE OPERATION IS LARGELY IN THE HANDS OF DOE. TO SAY THAT A STATE HAS NOT REQUESTED NEGOTIATIONS MISCONCEIVES THE ROLE OF DOE IN EXECUTING THE ACT. IN MY JUDGMENT, AND AS THE CONFERENCE REPORT ACCOMPANYING THE APPROPRIATIONS MEASURE THAT FUNDED THE NUCLEAR WASTE PROGRAM ACTIVITIES THIS FISCAL YEAR STATED, IN TERMS TOO CLEAR TO MISUNDERSTAND, SIGNIFICANT PROGRESS IN IMPLEMENTING THE ACT CANNOT BE MADE WITHOUT "CLOSE CONSULTATION WITH THE AFFECTED PARTIES, IN PARTICULAR, THE AFFECTED STATES."

I UNDERSTAND FULLY THAT GIVEN THE NATURE OF THIS PROGRAM IT IS NOT LIKELY THAT NEGOTIATIONS WILL BE EASY; THEY MAY AT TIMES BE CONTENTIOUS AND FRUSTRATING. BUT CONSULTATION MUST TAKE PLACE. IT CANNOT BE WISHED AWAY OR PUT OFF UNTIL A STATE DECIDES TO CONTACT DOE AND SAY "LET'S TALK." I BELIEVE, MR. CHAIRMAN, THAT THE STATES ARE INTERESTED IN WORKING WITH DOE TO RESOLVE THE ISSUES. BUT, AS IT STANDS, DOE HAS ALL THE INFORMATION IN ITS HANDS. IT MUST THEREFORE BE FORTHCOMING ABOUT ITS INTENTIONS AND PLANS WITH REGARD TO THE WASTE SITES.

MR. CHAIRMAN, MY APPEARANCE HERE TODAY UNDERSCORES MY DESIRE TO SEE THIS VITAL NATIONAL PROGRAM CARRIED OUT IN ACCORDANCE WITH THE CONGRESSIONAL INTENT. UP TO NOW, DOE HAS NOT SHOWN THE PROPER SOLICITUDE FOR THE WILL OF CONGRESS. IT HAS INSTEAD, REGRETTABLY, CHOSEN THE STRATEGY OF DIVIDE AND CONQUER. IT SEEMS TO BE COUNTING ON OUR INABILITY TO COME TO TERMS WITH THE FUNDAMENTAL CONFLICT THAT IS CREATED WHEN SITES ARE CHOSEN, RATHER THAN TRYING TO RECONCILE ITS ACTIONS WITH THE TERMS OF THE NUCLEAR WASTE POLICY ACT. THAT IS WHY I BELIEVE DOE'S SUGGESTION THAT IT WAS PRESENTING ITS DRAFT MISSION PLAN TO CONGRESS SO THAT CONGRESS "MAY PROVIDE ANY STATUTORY DIRECTION IT BELIEVES IS NEEDED TO CONDUCT THE PROGRAM" IS A HOLLOW ONE. CONGRESS HAS PROVIDED DOE WITH CLEAR STATUTORY DIRECTION. THE NUCLEAR WASTE POLICY ACT IS FULL OF DIRECTION; IT OFFERS GUIDELINES; IT ESTABLISHES DEADLINES. IT IS JUST THAT DOE PREFERS NOT TO FOLLOW IT. I SHOULD HOPE THAT THIS COMMITTEE WILL MAKE IT CLEAR TO DOE THAT IT MUST FOLLOW THE LAW AND GET ON WITH THE BUSINESS OF CHOOSING A SECOND SITE AND CONSULTING WITH THE STATES. I CANNOT THINK OF ANY OTHER DIRECTION DOE NEEDS .

MR. CHAIRMAN, MEMBERS OF THE COMMITTEE, I APPRECIATE THE CHANCE TO EXPRESS MY VIEWS. YOU HAVE ALWAYS BEEN WILLING TO HEAR ME OUT AND I THANK YOU FOR IT.

The CHAIRMAN. We have a strong group of witnesses today, and we would like to lead off with the Honorable Grant Sawyer, a former Governor of Nevada. He also is Chairman of the Nevada Commission on Nuclear Projects.

We would like to bring up at the same time, Governor, with you, Mr. Steve Frishman, Director of the Nuclear Waste Programs in the Office of the Governor of the State of Texas in Austin; and also Mr. Curtis Eschels, Special Assistant to the Governor of the State of Washington, in Olympia, Washington.

Gentlemen, welcome, and we would like to lead off with Governor Sawyer.

Governor, glad to have you here.

STATEMENT OF GRANT SAWYER, CHAIRMAN, NEVADA COMMISSION ON NUCLEAR PROJECTS, ACCOMPANIED BY ROBERT R. LOUX, CHAIRMAN, STATE OF NEVADA AGENCY FOR NUCLEAR PROJECTS

Mr. SAWYER. Thank you, Mr. Chairman and Members of the Committee, with particular greetings to our own senior Senator, Chic Hecht.

Sitting next to me, Mr. Chairman, is Bob Loux, who is Chairman of the State Agency on Nuclear Waste in Nevada, as contrasted with my position. I am the Chairman of a State Nuclear Commission, which the legislature created two years ago to somewhat oversee the State's concerns in this area.

We greatly appreciate your invitation to Governor Bryan to appear to discuss Nevada's concerns regarding this high-level nuclear waste program. Unfortunately, Governor Bryan had a prior commitment which I know he has conveyed to you, Mr. Chairman, that prevents him from being here. But he has requested that I present the State's views.

I am Grant Sawyer. I am Chairman of the Commission, as you indicated. I am a former Governor of Nevada. We commend you, and are very grateful for the fact that you have called these hearings. It is quite appropriate at this time to in effect consider I think the state of the nuclear repository program.

Regrettably, we must again report to you that the state of this program so far as Nevada perspective is concerned is bad, and appears to be getting worse. In fact, the situation in our view is so bad that Nevada and other affected States and Tribes really can no longer tolerate DOE's what in our view is mishandling of the program.

The utilities and their ratepayers, we believe, should be very concerned that DOE we believe is wasting millions of their dollars on a program that will not probably result in a safe place to dispose of the Nation's nuclear waste.

When Congress passed the Act in 1982, we think it did a commendable job in setting up a statutory framework for siting the Nation's High Level Waste Repositories. In essence, the Act was designed to establish a reasonably balanced, fair, and technically sound siting process that would assure credibility and acceptability through active State participation and oversight of Federal siting activities.

Nevertheless, as Nevada's representatives and others have described on a number of occasions to this Committee and other congressional committees, DOE in our view has grossly mishandled the implementation of the Act.

We have discussed in prior testimony how DOE has disregarded the letter and spirit of the Act on many critical issues concerning at least Nevada. We also have pointed out that DOE has failed to allow meaningful State participation in many vital aspects of this program.

When Nevada and other States and Tribes made such criticisms in the past, Mr. Chairman, we found that many seemed unwilling to acknowledge that the first round repository program was developing in what we thought was such a totally unfair and unacceptable manner. Perhaps some felt, and I can understand this, that we were simply voicing objections because it was based on the "not in my back yard" syndrome.

Well, Mr. Chairman, everyone is naturally concerned about their backyard; but we have other overriding concerns with this program, as well, which we think are our objective. Our objections are based on serious and indeed fundamental procedural and technical flaws that DOE has ingrained in this process.

It now appears that many in Congress and elsewhere are beginning to understand that our complaints and outcries in the past against DOE's actions do have a legitimate and a sound basis. DOE's blatant political and illegal actions in disregarding the Act and its cancellation--DOE I believe says deferral--of the second repository program have finally pierced the consciousness and possibly the conscience of many parties on this very critical issue, including I believe many people in Congress.

Moreover, the joint investigation by two House Subcommittees has already produced DOE decisional documents that demonstrate, in our view, that DOE manipulated and politicized the first-round selection process. Among other things, these documents indicate that DOE manipulated the ranking of both Washington and Nevada.

Under their siting program, there were no other choices except Nevada and Washington. DOE's current posture that can in effect change the laws simply by telling Congress that it is making amendments to its mission plan should enlighten and I think shock this Committee.

You now can see the type of cavalier and arrogant attitude and approach that we have been experiencing with DOE from the outset of this program. Mr. Chairman, we say that it is time to halt this reckless DOE train and have a moratorium to get the train back on the track that Congress intended when it passed the Act in 1982.

If this is not done, we have no doubt that DOE's misguided program will crash, and that billions of utility ratepayers' dollars will have been wasted without having solved this problem. We do not think that such a moratorium is needed to enable this Committee, and others, to examine fully how and why DOE's program has gotten so far off the track.

We ask that you and other congressional policymakers now undertake a thorough examination of this issue. We believe that there is no acceptable quick fix that can be made here. It is critical that the Committee understand that simply putting the second round back on track will not begin to solve the other overriding problems in the program.

Even national screenings of first-round sites would not begin to address the problems of the first-round program unless there is careful scrutiny and redrafting of DOE's guidelines. Many of the basic decisions that DOE has made with regard to the first depository sites are so biased and deficient that key aspects of the program are simply unacceptable to the affected States.

I could spend a lot of time, Mr. Chairman, explaining to you in detail the many fundamental flaws in DOE's program, as we view it. We have already stated those before other Committees, and I do not intend to reiterate that litany of grievances this morning.

I will refer you, however, by way of example to Nevada's statement of position concerning shortcomings in the repository program, which was attached to my remarks. While we would be happy to explain such various basic deficiencies again in DOE's program, many of which we have as I said discussed before the Committee in the past, I would instead like to highlight one other important concern that we have not yet had occasion to bring to this Committee's attention.

Funding of State participation is all part of the coordination and cooperation with the States and is a serious, ongoing problem for us in Nevada. Nevada's first brush with DOE in this area involved funding to allow Nevada to perform independent testing and monitoring of the geohydrologic and seismic properties of the Yucca Mountain site.

DOE denied that funding. Nevada sued, and the U.S. Court of Appeals for the Ninth Circuit upheld the State's position in December 1985. Notwithstanding the court's order, DOE still refused to fund these activities until after its May 28, 1986, announcement that Yucca Mountain would be characterized.

Mr. Chairman, DOE still refuses to evaluate and fund Nevada's request in a timely manner, and DOE has not acted upon Nevada's fiscal year 1987 grant request even though the Department has had it in hand for over four months. Even now, the Department will not tell us what additional information, if any, it needs to evaluate that request.

The fiscal year 1987 grant application includes not only the funding for the technical research work which was the subject of the earlier litigation, but also funding for preparation of a report and a request for socioeconomic impact assistance to which Nevada is expressly entitled pursuant to Section 116(c)(2) of the Act.

Now, Mr. Chairman, the unconscionable delays in providing funding for our State puts us in an almost untenable position. We cannot contract with the necessary scientific and engineering experts in order to properly fulfill the oversight function which the Act gives us. We cannot cooperate and coordinate if there is this constant delay and stall on providing funding for functions under the Act which the State is expressly entitled to.

We have had a continuing problem and still have a continuing problem even though the Federal courts have stated otherwise. The

DOE still does not provide the funding for us to fulfill the function which Congress envisioned that we fulfill in this program.

I would like, Mr. Chairman, in closing to call the Committee's attention to one other disturbing development. We have raised many technical concerns with regard to the adequacy of the Yucca Mountain site. Many of these same concerns, interestingly enough, were raised by the Nuclear Regulatory Commission's staff in response to the Department's 1984 Draft Environmental Assessment.

Our concerns were largely disregarded by DOE when it issued the Final Environmental Assessment. The Committee should be aware, and I am sure it is, that the NRC staff has again raised many of these same technical concerns in its comments on the Final Environmental Assessment published in December of 1986.

The NRC has generally pointed out that the Department is overly confident in its technical assumptions that the Department repeatedly interprets its data in a manner consistent with accomplishing its siting goals. By this, I mean the DOE concludes what it wants to conclude.

Now had just Nevada raised these concerns, it might again be considered a matter of pure parochial interest. But with the Regulatory Commission, that ultimate licensing authority, having raised generally the same concerns, we point out to the Committee that we consider them extremely legitimate going to the question of technical matters which the Chairman indicated earlier he would like to have us comment on.

I am sure that you will see when you study the NRC's comments the Commission is in effect pointing out that DOE's repository search program could very well produce an unacceptable site. The NRC's major comments are attached to my remarks.

Mr. Chairman, we believe there clearly is no need to allow this DOE juggernaught to continue recklessly charging ahead until it crashes. We have time for a moratorium, we believe, to stop the train and to develop a concensus in some manner on how to operate it safely in the future.

We should, for example, we believe, take the time to examine carefully progress made in other countries using different techniques for waste disposal and waste management. Just two weeks ago, Dr. Carl-Enik Nyquist, President of the Swedish State Power Board, testified before this Committee regarding the Swedish nuclear commission program. Several differences between Sweden's program and the United States were notable, or at least were reported in the press.

First, apparently the Swedes already have a monitored retrieval storage program in place. Its water pools are intended to cool waste to 100 degrees before emplacement in the granite repository. I might point out that none of these three sites that DOE has selected is granite. And it gives Sweden another 30 to 40 years within which to properly site and develop a repository.

Dr. Nyquist, as I understand it, testified that water pool storage of spent fuel could easily be extended for many, many years.

Second, the Swedish program entitles local governments—they have no States—to absolute vetoes of repository siting.

Third, Dr. Nyquist stressed repeatedly that the success of the Swedish spent fuel repository program in promoting public acceptance can be attributed to the identification of repository sites close to nuclear activities. The Swedes have also chosen to assign the repository mission to a utility collective—and I do not know whether Congress has considered that possibility or not—with the government participating, rather than the government operating the program itself. I have no comment on the efficacy of that. This has left the Swedish Government review agency, however, free to collectively oversee and even disapprove the project, thus enhancing public trust and confidence in the waste program.

I think even the Department of Energy acknowledges that the U.S. program needs more time. In the Mission Plan amendments that have just been put before you, DOE has proposed a five-year extension for commencement of operations at the first repository, and extension of the schedule for site characterization.

As I noted earlier, there appears to be in our view no quick fix to bring DOE's program back on track. This will require a careful investigation and examination of the State's concerns and of DOE's mistakes. Only after gaining a thorough understanding of these problems can a concensus—and we believe that a concensus in this situation is imperative—only with some time and with some collective judgments can such a concensus be built that will allow acceptable solutions to be developed.

This corrective process will require decisive action by Congress, and I cannot tell you specifically what I believe that action should be, but a firm Congressional hand to assure that DOE simply does not ignore remedial efforts and continue to move unconcernedly along what appears to be a preconceived path.

Mr. Chairman, we in Nevada are committed to working constructively with the Congress and the other parties in any such re-examination of the process. However, we must insist, as I believe other parties do, that the process and any solutions recommended be fair, and that credibility be restored to this program.

It is clear, I believe, that as part of this process Congress must revisit several fundamental questions. For example, if deep geologic disposal really is the safest and best solution to the waste disposal program, is it really? No other nation appears to regard it as such. The MRS, which is an integral part of the disposal system envisioned under the Act also needs to be re-examined.

We note the DOE's MRS proposal appears to be quite different from the Act's original concept of a proposed alternative to deep geologic disposal. There are many other issues that we think need to be addressed. For example, is it not patently unfair for one segment of the Nation to be the primary user and beneficiary of nuclear power, and for a different segment to bear the risk and stigma of its byproducts? That goes to the whole question of the abandonment of the second repository site—at least that is part of that equation.

Is DOE really the best entity to pursue the waste disposal mission, given the inherent conflicts of interest we think are in the DOE with regard to its defense and commercial nuclear programs?

All of these are difficult issues, we know, and we understand and appreciate certainly the job that you have. We think that it will require some time for consideration and resolution of what appears to be a program that is faulted and headed for possible disaster.

So we strongly urge, Mr. Chairman, that the Congress call for a moratorium to temporarily halt the program that we think is out of control, and probably headed for failure. Congress should then undertake, we believe, the careful analysis that is required to develop workable solutions to this difficult issue.

Thank you very much, Mr. Chairman.

[The prepared statement of Mr. Sawyer follows:]

TESTIMONY OF GRANT SAWYER
CHAIRMAN
NEVADA COMMISSION ON NUCLEAR PROJECTS

BEFORE

U.S. SENATE ENERGY COMMITTEE
FEBRUARY 4, 1987

CHAIRMAN JOHNSTON, AND MEMBERS OF THIS COMMITTEE, WE NEVADANS APPRECIATE YOUR INVITATION TO GOVERNOR RICHARD BRYAN TO APPEAR HERE TO DISCUSS NEVADA'S CONCERNS REGARDING THE FEDERAL GOVERNMENT'S HIGH-LEVEL NUCLEAR WASTE PROGRAM. UNFORTUNATELY, GOVERNOR BRYAN HAD A PRIOR COMMITMENT THAT HAS PREVENTED HIM FROM BEING HERE, BUT HE HAS REQUESTED THAT I PRESENT THE STATE'S VIEWS. I AM GRANT SAWYER, CHAIRMAN OF NEVADA'S COMMISSION ON NUCLEAR PROJECTS. FORMERLY, I SERVED AS GOVERNOR OF OUR STATE.

WE COMMEND YOU FOR CALLING THESE HEARINGS. IT IS QUITE APPROPRIATE AT THIS TIME TO IN EFFECT CONSIDER THE "STATE OF THE NUCLEAR REPOSITORY PROGRAM." REGRETTABLY, WE MUST AGAIN REPORT TO YOU THAT THE STATE OF THIS PROGRAM IS VERY BAD AND APPEARS TO BE GETTING EVEN WORSE. IN FACT, THE SITUATION IS SO BAD THAT NEVADA AND OTHER AFFECTED STATES AND TRIBES REALLY CAN NO LONGER TOLERATE DOE'S MISHANDLING OF THIS PROGRAM. THE UTILITIES AND THEIR RATEPAYERS SHOULD BE VERY CONCERNED THAT DOE IS WASTING MILLIONS OF THEIR DOLLARS ON A PROGRAM THAT WILL NOT RESULT IN A SAFE PLACE TO DISPOSE OF THE NATION'S NUCLEAR WASTE.

WHEN CONGRESS PASSED THE NWPA IN 1982, IT DID A COMMENDABLE JOB OF SETTING UP A STATUTORY FRAMEWORK FOR SITING THE NATION'S HIGH-LEVEL WASTE REPOSITORIES. IN ESSENCE, THE ACT WAS DESIGNED TO ESTABLISH A REGIONALLY BALANCED, FAIR AND TECHNICALLY SOUND SITING PROCESS THAT WOULD ASSURE CREDIBILITY AND ACCEPTABILITY THROUGH ACTIVE STATE PARTICIPATION AND OVERSIGHT OF FEDERAL SITING

ACTIVITIES. NEVERTHELESS, AS NEVADA'S REPRESENTATIVES AND OTHERS HAVE DESCRIBED ON A NUMBER OF OCCASIONS TO THIS COMMITTEE AND OTHER CONGRESSIONAL COMMITTEES, DOE HAS GROSSLY MISHANDLED THE IMPLEMENTATION OF THE ACT. WE HAVE DISCUSSED IN PRIOR TESTIMONY HOW DOE HAS DISREGARDED THE LETTER AND SPIRIT OF THE ACT ON MANY CRITICAL ISSUES. WE ALSO HAVE POINTED OUT THAT DOE HAS FAILED TO ALLOW MEANINGFUL STATE PARTICIPATION IN MANY VITAL ASPECTS OF THIS PROGRAM.

WHEN NEVADA AND OTHER STATES AND TRIBES MADE SUCH CRITICISMS IN THE PAST, WE FOUND THAT MANY SEEMED UNWILLING TO ACKNOWLEDGE THAT THE FIRST ROUND REPOSITORY PROGRAM WAS DEVELOPING IN SUCH A TOTALLY UNFAIR AND UNACCEPTABLE MANNER. PERHAPS, SOME FELT THAT WE WERE SIMPLY VOICING OBJECTIONS BASED ON THE "NOT IN MY BACKYARD" SYNDROME. WELL, MR. CHAIRMAN, EVERYONE IS NATURALLY CONCERNED ABOUT THEIR BACKYARD, BUT WE HAVE OTHER OVERRIDING CONCERNS WITH THIS PROGRAM. OUR OBJECTIONS ARE BASED ON SERIOUS, AND INDEED FUNDAMENTAL, PROCEDURAL AND TECHNICAL FLAWS THAT DOE HAS INGRAINED IN THIS PROCESS.

IT NOW APPEARS THAT MANY IN THE CONGRESS AND ELSEWHERE ARE BEGINNING TO UNDERSTAND THAT OUR OUTCRIES AGAINST DOE'S ACTIONS HAVE A LEGITIMATE AND SOUND BASIS. DOE'S BLATANT POLITICAL AND ILLEGAL ACTIONS IN DISREGARDING THE ACT IN ITS CANCELLATION OF THE SECOND REPOSITORY PROGRAM HAVE FINALLY PIERCED THE CONSCIOUSNESS- AND WE HOPE THE CONSCIENCE - OF MANY PARTIES ON THIS CRITICAL issue. Moreover, the joint investigation by two House subcommittees has already produced DOE decisional documents that demonstrate DOE manipulated and politicized the first round selection process. Among other things, these documents indicate that DOE manipulated the ranking of both Washington and Nevada. DOE's current posture - that it can in effect change the law simply by telling Congress that it is making amendments to its Mission Plan - should enlighten and shock this Committee. You now can see the type of cavalier, and arrogant attitude and approach that we have been experiencing with DOE from the outset of this program.

Mr. Chairman, we say that it is time to halt this reckless DOE train and have a moratorium to get the train back on the track that Congress intended when it passed the Act in 1982. If this is not done, we have no doubt that DOE's misguided program will crash, and the billions of utility ratepayers' dollars will have been wasted without having solved the nuclear waste problem.

We think that such a moratorium is needed to enable this Committee and others to examine fully how and why DOE's program has gotten so far off track. We ask that you and other Congressional policymakers now undertake a thorough examination of this issue.

There is no acceptable "quick fix" that can be made here. It is critical the Committee understand that simply putting the second round back on track will not begin to solve the other overriding

PROBLEMS IN THIS PROGRAM. EVEN NATIONAL SCREENING OF FIRST ROUND SITES WOULD NOT BEGIN TO ADDRESS THE PROBLEMS OF THE FIRST ROUND PROGRAM, UNLESS THERE IS CAREFUL SCRUTINY AND REDRAFTING OF DOE'S GUIDELINES. MANY OF THE BASIC DECISIONS THAT DOE HAS MADE WITH REGARD TO THE FIRST REPOSITORY SITES ARE SO BIASED AND DEFICIENT THAT KEY ASPECTS OF THE PROGRAM ARE SIMPLY UNACCEPTABLE TO THE AFFECTED STATES. I COULD SPEND HOURS TODAY EXPLAINING TO YOU IN DETAIL THE MANY FUNDAMENTAL FLAWS IN DOE'S PROGRAM. HOWEVER, TIME WILL NOT ALLOW ME TO REITERATE THAT LITANY OF OUR GRIEVANCES. I NOW WILL ONLY REFER YOU BY WAY OF EXAMPLE TO NEVADA'S "STATEMENT OF POSITION CONCERNING SHORTCOMINGS IN THE REPOSITORY PROGRAM," WHICH IS ATTACHED. THIS STATEMENT WAS PREPARED AS A RESPONSE TO DOE'S REPORT TO THE CONGRESS ON ITS PURPORTED ATTEMPTS TO NEGOTIATE A C&C AGREEMENT AS REQUIRED BY SECTION 117(A) OF THE ACT. AMONG OTHER THINGS, THIS STATEMENT HIGHLIGHTS NEVADA'S FUNDAMENTAL CONCERN THAT DOE HAD, IN REALITY, SELECTED YUCCA MOUNTAIN FOR SITE CHARACTERIZATION EVEN BEFORE THE ACT WAS PASSED, AND THAT DOE HAS FAILED TO EVALUATE THE NEVADA SITE OBJECTIVELY AGAINST OTHER POTENTIAL SITES. THE STATEMENT ALSO ILLUSTRATES HOW OUR BASIC "PRESELECTION" CONCERN HAS BEEN AGGRAVATED BY COUNTLESS OTHER DOE ACTIONS. WE HAVE FOUND MANY SUBSTANTIAL DEFICIENCIES IN THE GUIDELINES, IN THE ENVIRONMENTAL ASSESSMENTS, AND IN DOE'S DECISIONAL PROCESS FOR RECOMMENDING FIRST ROUND STATES. FOR EXAMPLE, DOE'S MANIPULATION OF THE ROCK DIVERSITY CRITERIA IN EFFECT GUARANTEED THAT YUCCA MOUNTAIN (AND HANFORD) WOULD BE NOMINATED FOR CHARACTERIZATION. DOE ALSO OMITTED PROPER

CONSIDERATION OF THE TRANSPORTATION IMPACT AND REGIONAL DISTRIBUTION OF REPOSITORIES FROM ALL FIVE POTENTIAL FIRST ROUND SITE ENVIRONMENTAL ANALYSES AND FROM THE SITING GUIDELINES. FINALLY, DOE HAS FAILED TO COMPARE THE FIVE NOMINATED SITES AGAINST ALL SITES UNDER CONSIDERATION, AS REQUIRED BY THE ACT. WE HAVE BEEN FORCED TO TAKE DOE TO COURT ON MANY OF THESE POINTS TO PROTECT OUR CITIZENS' INTERESTS, AS WELL AS, I BELIEVE, THE INTERESTS OF THE NATION AS A WHOLE.

WHILE WE WOULD BE HAPPY TO EXPLAIN SUCH VARIOUS BASIC DEFICIENCIES IN DOE'S PROGRAM (MANY OF WHICH WE HAVE DISCUSSED BEFORE THE COMMITTEE IN THE PAST) DURING THE COURSE OF YOUR INVESTIGATION OF THIS PROGRAM, I WOULD, INSTEAD, LIKE TO HIGHLIGHT TWO OTHER IMPORTANT CONCERNS THAT WE HAVE NOT YET HAD OCCASION TO BRING TO THIS COMMITTEE'S ATTENTION.

THE FIRST, FUNDING OF STATE PARTICIPATION, IS A SERIOUS, ONGOING PROBLEM. NEVADA'S FIRST BRUSH WITH THE DOE IN THIS AREA INVOLVED FUNDING TO ALLOW NEVADA TO PERFORM INDEPENDENT TESTING AND MONITORING OF THE GEOHYDROLOGIC AND SEISMIC PROPERTIES OF THE YUCCA MOUNTAIN SITE. WHEN DOE DENIED THAT FUNDING, NEVADA SUED, AND THE U.S. COURT OF APPEALS FOR THE NINTH CIRCUIT UPHELD THE STATE'S POSITION IN DECEMBER 1985. NOTWITHSTANDING THE COURT'S ORDER, DOE REFUSED TO FUND THESE ACTIVITIES UNTIL AFTER ITS MAY 28, 1986 ANNOUNCEMENT THAT YUCCA MOUNTAIN WOULD BE CHARACTERIZED.

MR. CHAIRMAN, DOE STILL REFUSES TO EVALUATE AND FUND NEVADA'S REQUESTS IN A TIMELY MANNER AND DOE HAS NOT ACTED UPON NEVADA'S FY 1987 GRANT REQUEST, EVEN THOUGH THE DEPARTMENT HAS HAD IT IN HAND FOR OVER FOUR MONTHS. EVEN NOW DOE WILL NOT TELL US WHAT ADDITIONAL INFORMATION, IF ANY, IS NEEDED TO EVALUATE THE REQUEST. THE FY 1987 GRANT APPLICATION INCLUDES NOT ONLY THE FUNDING FOR THE TECHNICAL RESEARCH WORK WHICH WAS THE SUBJECT OF THE EARLIER LITIGATION, BUT ALSO FUNDING FOR PREPARATION OF THE REPORT AND A REQUEST FOR SOCIOECONOMIC IMPACT ASSISTANCE TO WHICH NEVADA IS EXPRESSLY ENTITLED PURSUANT TO SECTION 116(C)(2) OF THE ACT.

A SECOND DEVELOPING PROBLEM RELATES TO DOE'S COMPLIANCE WITH ESTABLISHED STANDARDS OF ENVIRONMENTAL EVALUATION AND MONITORING. DOE'S CURRENT INTENTION IS TO GO FORWARD WITH SITE CHARACTERIZATION AND DEVELOPMENT WITHOUT EVER HAVING ESTABLISHED A SITE SPECIFIC ENVIRONMENTAL BASELINE FOR YUCCA MOUNTAIN. WITHOUT SUCH A BASELINE, HOW CAN DOE MONITOR CHANGES IN THE ENVIRONMENT ONCE CHARACTERIZATION ACTIVITIES BEGIN, SO AS TO MINIMIZE THE ENVIRONMENTAL IMPACTS OF THAT ACTIVITY, AS REQUIRED BY SECTION 113(A) OF THE ACT? HOW WILL DOE KNOW THE PRE-CHARACTERIZATION CONDITION OF THE SITE IN ORDER TO RESTORE IT IF YUCCA MOUNTAIN IS NOT SELECTED, AS REQUIRED BY SECTION 113(B) OF THE ACT? AND, HOW WILL DOE PUBLISH AN ADEQUATE ENVIRONMENTAL IMPACT STATEMENT, OR THE NRC SUBSEQUENTLY ADOPT IT, AS PROVIDED BY SECTION 114(F) OF THE ACT, IF NO PRE-ALTERATION ENVIRONMENTAL CONDITION WAS EVER ESTABLISHED?

I WOULD LIKE, MR. CHAIRMAN, TO CALL THE COMMITTEE'S ATTENTION TO ANOTHER DISTURBING DEVELOPMENT. NEVADA HAS RAISED MANY TECHNICAL CONCERNS WITH REGARD TO THE ADEQUACY OF THE YUCCA MOUNTAIN SITE, MANY OF WHICH WERE ALSO RAISED BY THE NRC STAFF IN RESPONSE TO DOE'S 1984 DRAFT ENVIRONMENTAL ASSESSMENT. OUR CONCERNS WERE LARGELY DISREGARDED BY DOE WHEN IT ISSUED THE FINAL EA'S. THE COMMITTEE SHOULD BE AWARE THAT THE NRC STAFF HAS AGAIN RAISED MANY OF THESE SAME TECHNICAL CONCERNS IN ITS COMMENTS ON THE FINAL EAS, PUBLISHED IN DECEMBER OF 1986. THE NRC HAS GENERALLY POINTED OUT THAT DOE IS OVERLY CONFIDENT IN ITS TECHNICAL ASSUMPTIONS, AND THAT THE DEPARTMENT REPEATEDLY INTERPRETS ITS DATA IN A MANNER CONSISTENT WITH ACCOMPLISHING ITS SITING GOALS. BY THIS I MEAN THAT DOE CONCLUDES WHAT IT WANTS TO CONCLUDE. AMONG OTHER THINGS, THE NRC NOTED DEFECTS IN DOE REASONING IN SIX IMPORTANT TECHNICAL AREAS:

1. ACTIVE FAULT MOVEMENT IN THE AREA OF YUCCA MOUNTAIN AND REACTIVATATION OF PRIOR FAULTING BY NUCLEAR WEAPONS TESTING;

2. HYDRO-THERMAL ACTIVITY BENEATH YUCCA MOUNTAIN WHICH COULD AFFECT THE WASTE ISOLATION CAPABILITY OF THE SITE OR ANY CONTAINERS USED THERE;

3. THE POSSIBILITY OF ORE DEPOSITS IN THE AREA THAT MIGHT CAUSE FUTURE HUMAN INTRUSION;

4. DOE'S OVER-RELIANCE ON THE GEO-CHEMICAL SYSTEM TO RETARD RADIONUCLIDE TRANSPORT THROUGH THE ROCK;

5. DOE'S OVER-RELIANCE ON MODELS OF GROUNDWATER TRAVEL TIME IN THE UNSATURATED ZONE (UNCERTAINTIES WERE INTRODUCED INTO THAT MODEL AS CONSTANTS); AND

6. DOE'S OVER-RELIANCE ON THE UNCERTAIN PERFORMANCE OF ENGINEERED BARRIER SYSTEMS, I.E. CASKS.

AS YOU WILL SEE WHEN YOU STUDY NRC'S COMMENTS, THE COMMISSION IS, IN EFFECT, POINTING OUT THAT DOE'S REPOSITORY SEARCH PROGRAM COULD VERY WELL PRODUCE AN UNLICENSABLE SITE. THE NRC'S MAJOR COMMENTS ARE ATTACHED.

MR. CHAIRMAN, THERE CLEARLY IS NO NEED TO ALLOW THIS DOE JUGGER NAUGHT TO CONTINUE RECKLESSLY CHARGING AHEAD UNTIL IT CRASHES. WE HAVE TIME FOR A MORATORIUM TO STOP THE TRAIN AND TO DEVELOP A CONSENSUS ON HOW TO OPERATE IT SAFELY IN THE FUTURE. WE SHOULD, FOR EXAMPLE, TAKE THE TIME TO EXAMINE CAREFULLY PROGRESS MADE IN OTHER COUNTRIES USING DIFFERENT TECHNIQUES FOR WASTE DISPOSAL AND WASTE MANAGEMENT. JUST TWO WEEKS AGO, DR. CARL-ENIK NYQUIST, PRESIDENT OF THE SWEDISH STATE POWER BOARD, TESTIFIED BEFORE THIS COMMITTEE REGARDING THE SWEDISH NUCLEAR REPOSITORY PROGRAM. SEVERAL DIFFERENCES BETWEEN SWEDEN'S PROGRAMS AND THE

United States' were notable. First, the Swedes already have a monitored retrievable storage program in place. Its water pools are intended to cool waste to 100 degrees C before emplacement in a granite repository, and to give Sweden another 30-40 years within which to properly site and develop a repository. Dr. Nyquist testified that water pool storage of spent fuel could easily be extended for years. Second, the Swedish program entitles local governments (they have no states) to absolute vetoes of repository siting decisions. Third, Dr. Nyquist stressed repeatedly that the success of the Swedish spent fuel repository program in promoting public acceptance can be attributed to the identification of repository sites close to nuclear reactors. The Swedes have also chosen to assign the repository mission to a utility collective with government participation rather than to the government itself. This has left the Swedish government review agency free to objectively oversee - and even disapprove - the project, thus enhancing public trust and confidence in the waste program.

Even the Department of Energy acknowledges that the U.S. program needs more time. In the Mission Plan amendments that have just been put before the Congress, DOE has proposed a five-year extension for commencement of operations at the first repository, and an extension of the schedule for site characterization.

As I noted earlier, there appears to be no "quick fix" to bring DOE's program back on track. This will require a careful

INVESTIGATION AND EXAMINATION OF THE STATES' CONCERNS AND OF DOE'S MISTAKES. ONLY AFTER GAINING A THOROUGH UNDERSTANDING OF THESE PROBLEMS CAN A CONSENSUS BE BUILT THAT WILL ALLOW ACCEPTABLE SOLUTIONS TO BE DEVELOPED. THIS CORRECTIVE PROCESS WILL REQUIRE DECISIVE ACTION BY CONGRESS TOGETHER WITH A FIRM CONGRESSIONAL HAND TO ASSURE THAT DOE DOES NOT SIMPLY IGNORE SUCH REMEDIAL EFFORTS AND CONTINUE TO MOVE UNCONCERNEDLY ALONG ITS PRECONCEIVED PATH.

MR. CHAIRMAN, WE IN NEVADA ARE COMMITTED TO WORK CONSTRUCTIVELY WITH THE CONGRESS AND OTHER PARTIES IN ANY SUCH REEXAMINATION PROCESS. HOWEVER, WE INSIST THAT THE PROCESS AND ANY SOLUTIONS RECOMMENDED BE FAIR, AND THAT CREDIBILITY BE RESTORED TO THIS PROGRAM. IT IS CLEAR, I BELIEVE, THAT AS A PART OF THIS PROCESS, CONGRESS MUST REVISIT SEVERAL FUNDAMENTAL QUESTIONS. FOR EXAMPLE, IS DEEP GEOLOGIC DISPOSAL REALLY THE SAFEST AND BEST SOLUTION TO THE WASTE DISPOSAL PROBLEM? NO OTHER NATION APPEARS TO REGARD IT AS SUCH. THE MRS, WHICH IS AN INTEGRAL PART OF THE DISPOSAL SYSTEM ENVISIONED UNDER THE ACT, ALSO NEEDS TO BE EXAMINED. WE NOTE THAT DOE'S MRS PROPOSAL APPEARS TO BE QUITE DIFFERENT FROM THE ACT'S ORIGINAL CONCEPT OF A PROPOSED ALTERNATIVE TO DEEP GEOLOGIC DISPOSAL. THERE ARE MANY OTHER ISSUES AND QUESTIONS THAT MUST BE ADDRESSED. FOR EXAMPLE, IS IT NOT PATENTLY UNFAIR FOR ONE SEGMENT OF THE NATION TO BE THE PRIMARY USER AND BENEFICIARY OF NUCLEAR POWER PRODUCTION AND FOR A DIFFERENT SEGMENT TO BEAR THE RISK AND STIGMA OF ITS BY-PRODUCTS? IS DOE REALLY THE BEST ENTITY TO PURSUE THE WASTE DISPOSAL MISSION, GIVEN THE

INHERENT CONFLICTS OF INTEREST WITH REGARD TO ITS DEFENSE AND COMMERCIAL NUCLEAR PROGRAMS?

ALL OF THESE DIFFICULT ISSUES WILL REQUIRE TIME FOR CONSIDERATION AND RESOLUTION. WE STRONGLY URGE, MR. CHAIRMAN, THAT THE CONGRESS CALL FOR A MORATORIUM TO TEMPORARILY HALT A PROGRAM THAT IS OUT OF CONTROL AND HEADED FOR FAILURE. CONGRESS SHOULD THEN UNDERTAKE THE CAREFUL ANALYSIS THAT IS REQUIRED TO DEVELOP WORKABLE SOLUTIONS TO THIS DIFFICULT ISSUE.

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON D C 20555

DEC 22 1986

JAN [illegible] 1987

Mr. Stephen H. Kale, Director
Office of Geologic Repositories
U.S. Department of Energy
Washington, DC 20585

Dear Mr. Kale:

The Nuclear Regulatory Commission (NRC) staff has completed its review of the five final Environmental Assessments (EA's) issued by the Department of Energy (DOE) on May 28, 1986 for the first high-level radioactive waste repository. The purpose of this letter is to inform you of the results of our review (Enclosure 1) for consideration by the DOE in the development of the Site Characterization Plans (SCP's).

These NRC staff comments on the final EA's are part of the continuing interface between the staffs of the DOE and NRC which will lead to early identification and resolution of potential licensing issues. In the short term our comments should assist the DOE in preparing high quality SCP's. Therefore, we believe that the opportunity afforded by the final EA's for early interaction between NRC and DOE will be beneficial to the progress of the repository program.

It is apparent that significant efforts were made by DOE to respond to each of the NRC staff major comments on the draft EA's, and in fact, many of these comments have been resolved. However, in each of the final EA's our review identified remaining concerns which are principally related to 1) not identifying the range of uncertainties associated with the existing limited data base, 2) not identifying the range of alternative interpretations and assumptions that can be reasonably supported by existing data, and 3) not incorporating a reasonable range of uncertainties and alternative interpretations into evaluations and conclusions. Based on these concerns we believe that some conclusions in all five final EA's are still overly favorable or optimistic for the areas of comment. At this stage of the site investigation and screening process there is inherent uncertainty in site information that can lead to alternative interpretations of data. Furthermore, resolution of uncertainties -- such as those identified in our comments -- must await detailed site characterization. However, recognition of these uncertainties and alternative interpretations is critical to the development of test plans that will lead to adequate characterization of sites and result in the information needed for licensing. To the extent necessary for demonstrating compliance with 10 CFR Part 60, site characterization testing should lead to narrowing the range of uncertainties, eliminating alternative interpretations and confirming or revising assumptions on the basis of new data and analyses. This narrowing process will not be effective unless test plans recognize the range of uncertainties and alternative interpretations and assumptions that can be reasonably supported by the existing data.

The NRC staff has not attempted, nor do we consider it appropriate to evaluate the ranking of the sites. Accordingly, we have not performed a detailed evaluation of the following two documents: "A Multiattribute Utility Analysis of Sites Nominated for Characterization for the First Radioactive-Waste Repository - A Decision Aiding Methodology (DOE/RW-0074) and "Recommendation by the Secretary of Energy of Candidate Sites for Site Characterization for the First Radioactive-Waste Repository" (DOE/S-0048). The review that was done indicates that conclusions on repository performance in the Methodology Document (DOE/RW-0074) that were derived from evaluations and conclusions in the final EA's, that are considered in our comments to be overly optimistic, are likewise considered optimistic.

Over the past few years we have identified the need for recognizing uncertainties and alternative interpretations in the DOE program as reflected in our comments on the BWIP Site Characterization Report (NUREG-0960), the draft EA's, and the draft Project Decision Schedule. In addition our staffs have met numerous times over the past few years to discuss this subject. While we feel that these interactions have resulted in final EA's which exhibit progress in these areas, we consider that further improvement in recognition of uncertainties and alternative interpretations is still needed. We also recognize the progress that has been made recently by DOE and NRC agreeing on how uncertainties and alternative interpretations will be considered in the SCP's and supporting study plans (NRC/DOE meeting on Level of Detail in the SCP, May 7-8, 1986). However, because of the difficulties encountered in the past in addressing uncertainties and alternative interpretations, we consider it important that our staffs discuss representative comments in these areas as part of our pre-SCP interactions to agree on how they will be considered in the development of test plans. Two representative comments which we consider would serve as timely examples for discussion at technical meetings in the near future are groundwater travel time at the Hanford Site and hydrothermal activity at the Yucca Mountain Site. Mr. Linehan will be contacting your staff to make arrangements for these and other pre-SCP technical meetings.

Sincerely,

Robert E. Browning, Director
Division of Waste Management
Office of Nuclear Material
Safety and Safeguards

Enclosure:
NRC Staff Comments on the DOE
Final EA's

NRC STAFF COMMENTS

ON THE

DOE FINAL ENVIRONMENTAL ASSESSMENTS

DECEMBER 22, 1986

DIVISION OF WASTE MANAGEMENT

U.S. NUCLEAR REGULATORY COMMISSION

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LIST OF CONTRIBUTORS

Technical Reviewers

Hanford Site

Harold Lefevre, lead technical reviewer, geology/geophysics
Michael Blackford, technical reviewer, geology/geophysics
Keith McConnell, technical reviewer, geology/geophysics
Abou-Bakr Ibrahim, technical reviewer, geology/geophysics
Mike Weber, lead technical reviewer, hydrology
Neil Coleman, technical reviewer, hydrology
Ted Johnson, technical reviewer, surface water hydrology
David Brooks, lead technical reviewer, geochemistry
Paul Bembia, technical reviewer, geochemistry
Tin Mo, technical reviewer, geochemistry
John Buckley, lead technical reviewer, rock mechanics/design
Kien Chang, lead technical reviewer, waste package
Everett Wick, technical reviewer, waste package
John Libert, lead technical reviewer, performance assessment
William Lilley, lead technical reviewer, environment/socioeconomics
Susan Bilhorn, lead technical reviewer, quality assurance

Yucca Mountain Site

Charlotte Abrams, lead technical reviewer, geology/geophysics
Keith McConnell, technical reviewer, geology/geophysics
Michael Blackford, technical reviewer, seismology
Jeffrey Pohle, lead technical reviewer, hydrology
Richard Codell, technical reviewer, hydrology
Ted Johnson, technical reviewer, surface water hydrology
John Bradbury, lead technical reviewer, geochemistry
Linda Kovach, technical reviewer, geochemistry
Paul Bembia, technical reviewer, geochemistry
Dinesh Gupta, lead technical reviewer, rock mechanics/design
John Peshel, technical reviewer, rock mechanics/design
David Tiktinsky, technical reviewer, rock mechanics/design
Thomas Jungling, lead technical reviewer, waste package
Sandra Wastler, lead technical reviewer, performance assessment
William Lilley, lead technical reviewer, environment/socioeconomics
Susan Bilhorn, lead technical reviewer, quality assurance

Davis Canyon Site

Julia Corrado, lead technical reviewer, geology/geophysics
Richard Lee, technical reviewer, geology/geophysics
Michael Blackford, technical reviewer, seismology

Abou-Bakr Ibrahim, technical reviewer, geology/geophysics
Atef Elzeftawy, lead technical reviewer, hydrology
Frederick Ross, technical reviewer, hydrology
Ted Johnson, technical reviewer, surface water hydrology
Walt Kelly, lead technical reviewer, geochemistry
John Bradbury, technical reviewer, geochemistry
Jerry Pearring, lead technical reviewer, rock mechanics/design
Naiem Tanious, technical reviewer, rock mechanics/design
Steve Smykowski, technical reviewer, rock mechanics/design
Li Yang, technical reviewer, rock mechanics
John Voglewede, lead technical reviewer, waste package
Charles Peterson, technical reviewer, waste package
Pauline Brooks, lead technical reviewer, performance assessment
William Lilley, lead technical reviewer, environment/socioeconomics
Susan Bilhorn, lead technical reviewer, quality assurance

Deaf Smith Site

Julia Corrado, lead technical reviewer, geology/geophysics
Richard Lee, technical reviewer, geology/geophysics
Frederick Ross, lead technical reviewer, hydrology
Ted Johnson, technical reviewer, surface water hydrology
Walt Kelly, lead technical reviewer, geochemistry
Jim Tesoriero, technical reviewer, geochemistry
Jerry Pearring, lead technical reviewer, rock mechanics/design
Naiem Tanious, technical reviewer, rock mechanics/design
John Voglewede, lead technical reviewer, waste package
Charles Peterson, technical reviewer, waste package
Pauline Brooks, lead technical reviewer, performance assessment
William Lilley, lead technical reviewer, environment/socioeconomics
Susan Bilhorn, lead technical reviewer, quality assurance

Richton Dome Site

Julia Corrado, lead technical reviewer, geology/geophysics
Richard Lee, technical reviewer, geology, geophysics
William Ford, lead technical reviewer, hydrology
Frederick Ross, technical reviewer, hydrology
Ted Johnson, technical reviewer, surface water hydrology
Walt Kelly, lead technical reviewer, geochemistry
Jim Tesoriero, technical reviewer, geochemistry
Jerry Pearring, lead technical reviewer, rock mechanics/design
Sarad Jagannath, technical reviewer, rock mechanics/design
Naiem Tanious, technical reviewer, rock mechanics/design
John Voglewede, lead technical reviewer, waste package
Charles Peterson, technical reviewer, waste package
Pauline Brooks, lead technical reviewer, performance assessment
William Lilley, lead technical reviewer, environment/socioeconomics
Susan Bilhorn, lead technical reviewer, quality assurance

Section/Technical Quality Reviewers

John Trapp, acting section leader, geology/geophysics
Myron Fliegel, section leader, hydrology
Kenneth Jackson, section leader, geochemistry
Mysore Nataraja, section leader, rock mechanics/design
Timothy Johnson, section leader, waste package
Seth Coplan, section leader, performance assessment
Regis Boyle, section leader, environment/socioeconomics

Project Reviewers

Paul Hildenbrand, project manager, Hanford Site
John Libert, project reviewer/integration, Hanford Site
Phil Altomare, project reviewer/policy, Hanford Site
Robert Johnson, project manager, Davis Canyon Site, Deaf Smith Site, Richton Dome Site
Pauline Brooks, project reviewer/integration, Davis Canyon Site, Deaf Smith Site, Richton Dome Site
Dan Galson, project reviewer, Davis Canyon Site, Deaf Smith Site, Richton Dome Site
Robert MacDougall, project reviewer/policy, Davis Canyon Site, Deaf Smith Site, Richton Dome Site
King Stablein, project manager, Yucca Mountain Site
Sandra Wastler, project reviewer/integration, Yucca Mountain Site

Production Manager

Eileen Tana

Branch Chief Reviewers

John Greeves, branch chief, engineering
Philip Justus, acting branch chief, geotechnical
John Linehan, acting branch chief, repository projects

Decision Support System Reviewers

Lech Beratan
Francis Cameron
John Surmeier

Final EA Review Coordinator

Robert Johnson

Division/Office Director Reviewers

Robert Browning, Director, Division of Waste Management
John Davis, Director, Office of Nuclear Material Safety and Safeguards

INTRODUCTION

Background

The Department of Energy (DOE) issued for public comment nine draft Environmental Assessment (EA's) on December 20, 1984. The Nuclear Regulatory Commission (NRC) reviewed the nine draft EA's and gave DOE comments on March 20, 1985 (SECY-85-114). Subsequent to the public comment period, DOE prepared revisions to the draft EA's in response to comments received from Federal and State agencies, Indian Tribes, various interest groups and members of the public. In accordance with the repository siting guidelines (10 CFR Part 960) the Secretary of Energy on May 28, 1986 issued five final EA's and nominated five sites that he determined suitable for site characterization from the original nine potentially acceptable sites. The five sites nominated are Davis Canyon, Deaf Smith, Hanford, Richton Dome, and Yucca Mountain (the same sites proposed for nomination in the draft EA's). The Secretary of Energy also recommended three of the five sites for site characterization: Deaf Smith, Hanford, and Yucca Mountain (the same sites proposed for recommendation in the draft EA's). The President has approved this recommendation. DOE also issued two other documents titled: "A Multiattribute Utility Analysis of Sites Nominated for Characterization for the First Radioactive-Waste Repository - A Decision-Aiding Methodology" (DOE/RW-0074, referred to below as the Methodology Document) and "Recommendation by the Secretary of Energy of Candidate Sites for Site Characterization for the First Radioactive-Waste Repository" (DOE/S-0048, referred to below as the Recommendation Document). Together with the final EA's these documents provide the support for the DOE nomination and recommendation decisions.

NRC Staff Review

The NRC staff has reviewed and prepared comments on all five final EA's. The staff conducted its review according to the NRC Division of Waste Management's "Standard Review Plan for Final Environmental Assessments" (March 18, 1986), which states that the final EA review is being done 1) to inform the Commission of any major concerns the staff may have with the final EA's and 2) to support NRC's ongoing effort to identify major concerns important to NRC's prelicensing consultation with DOE. The Nuclear Waste Policy Act (NWPA) and NRC regulations governing licensing of the geologic repository provide for consultation between DOE and NRC staffs prior to formal licensing to assure that licensing information needs and requirements are identified at an early time. The final EA's give current information and revised DOE conclusions regarding the sites after considerable evaluation by DOE of numerous comments on the draft EA's. Therefore, they provide current DOE positions and a foundation upon which DOE's project planning (including preparations for the Site Characterization Plans (SCP's) and draft Environmental Impact Statement (EIS)) will be developed for those sites recommended for site characterization.

These NRC staff comments on the final EA's are part of the continuing interface between the staffs of the DOE and NRC which will lead to early identification of potential licensing issues. In the short term our comments should assist the DOE in preparing high quality SCP's. In its concurrence action on the siting guidelines, the Commission found that the guidelines are consistent with the requirements of its own regulations on geologic repositories (10 CFR Part 60). Therefore, while the staff has not identified how its comments relate to the specific requirements of 10 CFR Part 60, the NRC staff considers that they serve to identify open items which are relevant to potential licensing of each site based on information currently available and which will need to be resolved during site characterization. Therefore, we believe that the opportunity afforded by the final EA's for early interaction between NRC and DOE will be beneficial to the progress of the repository program.

The objectives of the NRC staff review are as follows:

1. Identify and document any major concerns with DOE's responses to the NRC major comments on the draft EA's and certain detailed comments (i.e. those referenced by major comments and other detailed comments that now appear to warrant the same attention as the major comments based on the ongoing review of DOE's program). In other words identify residual major concerns not adequately addressed by DOE.

2. Become aware of as well as identify and document any major concerns with new data and information resulting from revisions/additions to the draft EA's by DOE.

3. Identify and document any major concerns with changes to the findings and supporting material in the final EA's.

4. Identify and document major concerns with the technical evaluations in Chapter 7, the Methodology Document, and the Recommendation Document including inconsistencies in use of data, interpretations, etc., between Chapter 7, the Methodology Document, the Recommendation Document and supporting final EA chapters. This does not include a review of the evaluation methodology or the ranking of the sites.

5. Identify and document any inconsistencies between the evaluation methodology in Chapter 7, the Methodology Document, and the Recommendation Document and the siting guidelines as concurred in by the Commission (including whether or not the evaluation methodology is an interpretation of the guidelines).

The final EA review is not a review like that of the draft EA; it is not a comprehensive and detailed review effort to identify every concern and document these concerns as major and detailed comments. The final EA review, as indicated above, focuses only on documenting major concerns in the form of major comments. Detailed comments, which were developed for the draft EA reviews to improve the information provided in the final EA's, were not developed since the EA's are now final. Furthermore, identifying only major concerns sharply focuses on high priority concerns needing attention in the SCP development.

Just as in the draft EA review, the NRC staff has not performed a detailed review with regard to the site characterization plans described in Chapter 4 or the repository descriptions in Chapter 5 of the final EA's. The staff only commented on the plans for characterizing the geohydrological regime beneath Canyonlands, National Park, (close to the Davis Canyon site) because it was a major comment on the draft EA, and because of the potential impact on the park. Site characterization plans and repository descriptions will be reviewed by the NRC staff upon receipt of the SCP's, and comments will be documented in NRC's Site Characterization Analyses.

Because of the limited time available for review relative to the amount of information existing for the five sites, the staff prepared for the final EA reviews long before their receipt. Preparations included 1) reviewing selected new or revised final EA references containing significantly different information, 2) reviewing draft EA comments from States, Indian Tribes, and other Federal agencies, 3) conducting technical meetings with DOE, States and Indian Tribes on selected technical concerns identified in draft EA comments, and 4) conducting selected data reviews and site visits. This early preparation and familiarization with the existing data base has allowed the staff to better determine if the conclusions in the final EA's are consistent with the available data.

Contents

The attached comments describe only major concerns resulting from the review of the final EA's. Therefore, "no comment" merely indicates that no major concerns were identified. Table 1 lists for each final EA the major comments resulting from both the draft and final EA reviews thus indicating in which areas major concerns remain. Major comments are grouped for each of the five final EA's. Within the group of comments for each separate final EA the order is governed by the fact that some comments, which help the reader understand others, come first.

The heading for each comment contains a reference to the appropriate draft EA comment for ease in tracking the staff's concerns back to the original comment. Also identified in the heading for organizational purposes are the relevant guideline conditions. Each comment consists of 1) a statement of the original concern with the draft EA; 2) those portions of the original concern that have been resolved; 3) the remaining major concern(s); 4) the basis for the remaining concern with reference to appropriate sections in the final EA; and 5) the significance of the remaining concern.

Comments that appear nearly identical for the different sites reflect information that was presented in the final EA's that was very similar among sites. Similar comments do, however, take into consideration differences resulting from site-specific information.

CONCLUSIONS AND RECOMMENDATIONS

It is apparent that significant efforts were made by DOE to respond to the NRC staff major comments on the draft EA's, and in fact many of these comments have been resolved. however, for each of the final EA's our review identified remaining concerns many of which are the same type of concerns identified in our review of the draft EA's such as 1) not identifying the range of uncertainties associated with the existing limited data base, 2) not identifying the range of alternative interpretations and assumptions that can be reasonably supported by existing data, and 3) not incorporating a reasonable range of uncertainties and alternative interpretations into evaluations and conclusions. Based on the above we believe that some conclusions in the final EA's are still overly favorable or optimistic for the areas of comment.

In accordance with our review plan, the NRC staff also reviewed aspects of the Methodology Document. As mentioned earlier the NRC staff did not evaluate the ranking of the sites or the ranking methodology itself. Just as was done for the draft EA's, the review focused on the existing data and how that data was used in the evaluations in the final EA's and the Methodology Document. From this review it was clear that evaluations and conclusions regarding site conditions presented in the final EA's were factored into the evaluations of scenarios and their consequences presented in the Methodology Document. Therefore, conclusions on repository performance in the Methodology Document that were derived from evaluations and conclusions in the final EA's, that are considered in our comments to be overly optimistic, are likewise considered to be overly optimistic. Some examples for the Hanford Site are 1) insufficient consideration of flow along large, discrete faults and fracture zones that may exist within dense flow interiors, including consideration of fracture flow as an "unexpected" feature rather than an "expected" one, and 2) inadequate consideration of alternative assumptions regarding pumping for the small-scale exploratory drilling scenario. Some factors which were not given sufficient consideration for the salt sites are 1) effects of host rock mass heterogeneities and 2) shaft and repository sealing concerns related to thermally inducted salt creep and differential uplift. An example from the Yucca Mountain Site is the lack of consideration that hydrothermal activity could be a future source of fluid important to waste package corrosion. For all sites, the effects of alternative corrosion mechanisms were not factored into waste package lifetime analyses. Finally, considering the examples noted above, it is overly optimistic to state on p. 3-41 of the Methodology Document that "When placed on a scale where a zero can be interpreted as performance at the minimum level required by the primary-containment requirements of the EPA standards and 100 is perfection, all of the sites have expected utilities of 99.7 or higher."

The significance of the above concerns is to DOE's ongoing preparation of the SCP's and eventually to site characterization activities, since both the general over optimism as well as the specific concerns could result in inadequate testing programs and inadequate information at the time of licensing. Should the range of uncertainties and alternative interpretations and assumptions that can be reasonably supported by the existing data not be considered in the SCP development, the SCP could be deficient in the identification and description of 1) the site including the range of uncertainties in known site conditions; 2) the issues and information needed to resolve issues; 3) the issue resolution strategies; 4) the performance allocation (i.e. the definition of performance goals and desired, associated confidence levels for various components of the repository system); 5) the investigation and study plans (tests and analyses); and 6) the rationales for investigations and studies with consideration to various sources of uncertainty. To the extent necessary for demonstrating compliance with 10 CFR Part 60, site characterization tests should lead to narrowing the range of uncertainties and eliminating alternative interpretations and confirming or revising assumptions on the basis of new data and analyses. This narrowing process will not be effective unless the test plans recognize the range of uncertainties and alternative interpretations and assumptions that can be reasonably supported by the existing data. It is important to note that because our comments are only related to the material which we reviewed in the final EA, they are not a complete list of our concerns important to the SCP development. We have identified such concerns in our correspondence and technical meeting summaries with DOE.

Over the past few years we have identified the need for recognizing uncertainties and alternative interpretations in the DOE program as reflected in our comments on the BWIP Site Characterization Report (NUREG-0960), the draft EA's, and the draft Project Decision Schedule. In addition, the NRC and DOE staffs have met numerous times over the past few years to discuss this subject. While we feel that these interactions have resulted in final EA's which exhibit some progress in these areas, we consider that further improvement in recognition of uncertainties and alternative interpretations is still needed. In addition, further progress has been made recently by DOE and NRC agreeing on how uncertainties and alternative interpretations will be considered in the SCP's and supporting study plans (NRC/DOE meeting on Level of Detail in the SCP, May 7-8, 1986). For the above reasons we are providing our comments for DOE's consideration. Furthermore, we recommend that because of the difficulties encountered in the past in addressing uncertainties and alternative interpretations we consider it important that the NRC and DOE staffs discuss representative comments in these areas as part of our pre-SCP interactions to agree on how they will be considered in the development of test plans.

TABLE 1 SUMMARY OF CONCERNS WITH THE FINAL EA'S

FINAL EA	DRAFT EA MAJOR COMMENT	CONCERN WITH FINAL EA RESOLUTION*
Hanford	1. Groundwater travel time	Groundwater travel time (5)**
	2. Changes that could affect the geohydrologic regime	No major concern
	3. Geochemical environment	Redox conditions (6) Microbial/Organic Complexes and Radionuclide Retardation (new comment based on new information) (7)
	4. Tectonic stability	Potential fault activity (2) Rate and style of deformation (3) Seismicity (4)
	5. Natural resources	No major concern Potential geothermal resources (new comment based on new information) (1)
	6. Thickness of host rock	No major concern
	7. Shaft construction	No major concern
	8. Waste package lifetime	Waste package lifetime (8)
	9. Surface flooding	No major concerns
	10. Comparative evaluation of sites	No major concerns

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*The concerns found with the final EA resolutions represent a range from essentially no resolution to resolution of all but a few of the original draft EA concerns. It is important to note that even where major concerns remain, some of the original concerns were addressed and in many cases improvements were evident in the final EA's.

**The number in parenthesis is the final EA comment number.

TABLE 1 (CONTINUED) SUMMARY OF CONCERNS WITH THE FINAL EA'S

FINAL EA	DRAFT EA MAJOR COMMENT	CONCERN WITH FINAL EA RESOLUTION
Yucca Mountain	1. Fault activity	Fault activity (1) Northeast trending faults (2) Detachment faulting (3)
	2. Volcanism/hydrothermal activity	Hydrothermal activity (4) Natural resources data relevant to the evaluation (5)
	3. Groundwater travel time calculations	Groundwater travel time (7)
	4. Free drainage of host rock	No major concerns
	5. Groundwater chemistry of the unsaturated zone	No major concerns
	6. Retardation of radionuclides	Retardation of radionuclides (8)
	7. Mineral stability	No major concerns
	8. Radionuclide transport increase due to changes in geohydrologic and climatic conditions	Radionuclide transport increase due to changes in geohydrologic and climatic conditions (6)
	9. Surface flooding	No major concerns
	10. Waste package postclosure performance	Waste package postclosure performance (9)
	11. Comparative evaluation of sites	No major concerns

TABLE 1 (CONTINUED) SUMMARY OF CONCERNS WITH THE FINAL EA'S

FINAL EA	DRAFT EA MAJOR COMMENT	CONCERN WITH FINAL EA RESOLUTION
Davis Canyon	1. Tectonics and structural discontinuities	Structure and tectonics (1)
	2. Dissolution	Dissolution (2)
	3. Groundwater travel time	Groundwater travel time (3)
	4. Hydraulic gradient	No major concern
	5. Host rock carnallite	Decomposition of carnallite (4)
	6. Radionuclide mobility	Redox conditions (5)
	7. Effects of host rock mass heterogeneity	Effects of host rock mass heterogeneity (6)
	8. Retrievability	No major concern
	9. Shaft sealing	Shaft sealing (7)
	10. Waste package performance predictions	Waste package performance prediction (8)
	11. Controlled area	No major concern
	12. Potential field studies in Canyonlands National Park	Potential field studies in Canyonlands National Park (9)
	13. Surface flooding	No major concern
	14. Comparative evaluation of sites	No major concern

TABLE 1 (CONTINUED) SUMMARY OF CONCERNS WITH THE FINAL EA'S

FINAL EA	DRAFT EA MAJOR COMMENT	CONCERN WITH FINAL EA RESOLUTION
Deaf Smith	1. Structural discontinuities	Dissolution (1)
	2. Dissolution	
	3. Groundwater travel time	Groundwater travel time (2)
	4. Host rock clay content and dehydration	No major concerns
	5. Radionuclide mobility	Redox conditions (3)
	6. Effects of host rock mass heterogeneity	Effects of host rock mass heterogeneity (4)
	7. Retrievability	No major concerns
	8. Shaft sealing	Shaft sealing (5)
	9. Waste package performance predictions	Waste package performance predictions (6)
	10. Controlled area	No major concerns
	11. Surface flooding	No major concerns
	12. Comparative evaluation of sites	No major concerns

TABLE 1 (CONTINUED) SUMMARY OF CONCERNS WITH THE FINAL EA'S

FINAL EA	DRAFT EA MAJOR COMMENT	CONCERN WITH FINAL EA RESOLUTION
Richton Dome	1. Fractures and anomalous zones	No major concerns
	2. Dissolution	No major concerns
	3. Groundwater travel time	No major concerns
	4. Radionuclide mobility	Redox conditions (1)
	5. Effects of host rock mass heterogeneity	Effects of host rock mass heterogeneity (2)
	6. Shaft sealing	Shaft sealing (3)
	7. Retrievability	No major concerns
	8. Waste package performance predictions	Waste package performance predictions (4)
	9. Controlled area	No major concerns
	10. Surface flooding	No major concerns
	11. Comparative evaluation of sites	No major concerns

MAJOR COMMENTS

ON

YUCCA MOUNTAIN SITE

Comment 1

Fault Activity (Draft EA Major Comment 1)

Guidelines on Tectonics 10 CFR 960.4-2-7 (d); and 960.5-2-11 (a),(c)(3)

In NRC staff major comment 1 on the draft EA for Yucca Mountain the concern was raised that despite indications elsewhere in the draft EA that the faults in the vicinity of Yucca Mountain are considered as potentially active, they are considered to be not active in the assessment of the expected nature and rates of fault movement at the Yucca Mountain site. Preliminary seismic assessments in the final EA are still based on the assumption--supported by some justification (final EA, Section C.4.1.1, page C.4-5)--that the faults at Yucca Mountain are not active (final EA, Section 6.3.1.7.5, page 6-275, last paragraph). However, elsewhere in the final EA (Section 6.3.1.7.4, pages 6-267 and 6-268) the faults are considered as potentially active; in light of the evidence supporting that position--in the final EA and in this comment--the NRC considers that the concerns expressed in the original comment remain relevant to the discussions in the final EA.

Justification for the assumption in the final EA that the faults at Yucca Mountain are not active is identified as being obtained from U.S.G.S. Open File Report 84-792 (final EA, page C.4-5, last paragraph). However, the interpretation presented in U.S.G.S. (1984) is at least in part based on the assumption that maximum and intermediate principal stresses are essentially equal (U.S.G.S., 1984, page 76), an interpretation that has recently been disputed (Healy and others, 1984; Stock and others, 1985). In addition, there is a growing body of evidence that supports an interpretation that at least some of the north-trending normal faults in the vicinity of Yucca Mountain have had movement in the last 40,000 years. The primary evidence for Holocene faulting at Yucca Mountain is a thermoluminescence age of approximately 6000 years for latest movement on a fault in the eastern part of Crater Flat (final EA, page 3-20, 1st paragraph). Isotopic evidence from other parts of the NTS supports ages of less than 40,000 years for latest movement along favorably oriented faults. This evidence includes ages of approximately 35,000 years and 37-97,000 years for the last natural movement on the Yucca and Carpetbag faults respectively (Knauss, 1981). At least portions of the Yucca fault may have had natural movement as recent as 1000 years ago (Knauss, 1981).

Both the Carpetbag and Yucca faults and similarly oriented faults in Panute Mesa have been reactivated by nuclear weapons tests suggesting that stress magnitudes in the vicinity of the faults are at or close to values at which failure would occur along favorably oriented structures (final EA, page 6-268). At Yucca Mountain, hydrofrac tests in holes USW G-1 and G-2 by Stuck and others (1985, page 8705) indicate that stress magnitudes at Yucca Mountain have measured values "close to values at which slip would occur on favorably oriented faults" (also see Healy and others, 1984). The fact that slip is occurring along favorably oriented structures is supported by seismic evidence that indicates that north trending faults are active on the NTS. For example, earthquakes associated with northeast-trending faults are believed to be associated with "shorter intervening fault segments with a north strike" (final EA, page 3-20, 3rd paragraph).

Comment 2

Northeast-Trending Faults-(Draft EA Detailed Comments 3-2, 3-3, 3-4, 3-5, 3-8)

Guidelines on Tectonics 10 CFR 960.4-2-7 (c)(5), (c)(6), (d) and 960.5-2-11 (c)(3), (d)

In several comments on the draft EA (detailed comments 3-2, 3-3, 3-4, 3-5, 3-8) the NRC staff indicated that the limited recognition and discussion of northeast-trending strike-slip faults near Yucca Mountain contributed to an inadequate assessment of the nature and rate of fault movement at the Yucca Mountain site. Examination of the final EA shows that consideration of those faults is still limited. In fact, the importance of the northeast-trending structures was de-emphasized by the omission of the northeast-trending Mine Mountain fault from figure 3-4 (final EA, page 3-14, map portraying major Basin-Range faults) and by the lack of discussion of Maldonado's (1985) map of the Jackass Flats area on which he extends the Mine Mountain fault zone across Jackass Flats east of Yucca Mountain. The NRC staff considers that the original comments remain relevant to the final EA and that the omission of the northeast-trending strike-slip faults reflects inadequate recognition of current uncertainties regarding the nature and rates of fault movement.

The bases for the concerns raised by the NRC staff relate to the aforementioned Mine Mountain fault in particular and to five features of northeast-trending faults in the Yucca Mountain area in general (detailed below). These six factors strongly suggest that northeast-trending faults are an important tectonic element in the seismotectonic evaluation of the Yucca Mountain site.

1) Historical seismicity is associated with the northeast-trending Mine Mountain, Rock Valley, and Cane Spring strike-slip faults (20, 26, and 29 kilometers from the site respectively) (U.S.G.S., 1984). Northeast-trending strike-slip faults are considered to be the most seismically active faults on the NTS (McKague and Orkild, 1984; U.S.G.S., 1984).

2) The southeastern corner of Yucca Mountain lies along the western margin of the Spotted Range-Mine Mountain structural zone, a major northeast-trending structural belt (Carr, 1984). The Mine Mountain fault, a major northeast-trending seismically active fault within the Spotted Range-Mine Mountain structural zone, trends southwestward into Jackass Flats (U.S.G.S., 1984, Figure 3) and may extend across Jackass Flats (Maldonado, 1985). Extension of the Mine Mountain fault southward through Jackass Flats brings the fault closer to Yucca Mountain than the 14 km which separates the Bare Mountain fault from the repository site. The Bare Mountain fault is used as the baseline for seismic risk (final EA, Section 6.3.1.7.5, page 6-276).

3) Scott and Bonk (1984) mapped an area of very closely spaced, northeast-trending faults in the southern part of the site (final EA, page 3-15, first paragraph). The significance of these northeast-trending faults at Yucca Mountain and their potential for movement in the present stress field is unknown.

4) A northeast-trending aeromagnetic lineament that passes through the center of Lathrop Wells basalt center is located just to the south of the site and east of Busted Butte (Carr, 1984, Figure 28). Maldonado (1985) places a northeast-trending fault along the trend of this aeromagnetic lineament (approximately 8 km from the repository site) extending the fault northeastward into the Shoshone Mountain area. Northeast-trending faults are known to be present on Yucca Mountain and Busted Butte; the relation of these faults to the aeromagnetic lineament (fault?) and to seismicity in the Spotted Range-Mine Mountain structural zone is unknown.

5) Volcanism, particularly younger basaltic activity, is oriented along a fairly consistent northeast trend (Carr, 1984). This northeast-trending belt of basaltic volcanism near Yucca Mountain is termed the Death Valley-Pancake Range belt by Carr (1984) and is known for its relative youthfulness and association with a higher than regional tectonic flux. Of concern to the NRC staff is the relationship of volcanism to the northeast-trending faults near Yucca Mountain as possibly demonstrated by the association of Lathrop Wells basalt center to the northeast-trending aeromagnetic lineament passing just to the east of Busted Butte (Carr, 1984).

The NRC staff considers that the lack of a comprehensive evaluation of northeast-trending structural features could result in underestimated values for magnitudes of vibratory ground motion and the potential for volcanism at the repository. In the final EA, the Bare Mountain fault is used for the determination of seismic risk. The U.S.G.S. (1984) states that if faults nearer to Yucca Mountain than the Bare Mountain fault are found to be active, then acceleration estimates determined for Yucca Mountain could be much higher. The Mine Mountain fault and its possible extension through Jackass Flats, the closely spaced faults of Scott and Bonk (1984), and the northeast-trending aeromagnetic lineament (Carr, 1984) are all important tectonic elements in the determination of seismic risk at Yucca Mountain.

Comment 3

Detachment Faulting

Guidelines on Tectonics 10 CFR 960.4-2-7 (c)(5), (c)(6), (d); and 960.5-2-11 (c)(3), (d)

The final EA states that low-angle detachment faults may be present below Yucca Mountain and that the possibility that they do exist will be explored during site characterization (final EA, Section C.4.1.1, page C.4-4, 4th paragraph). Based on documented evidence of the development of detachments in the Basin and Range Province during the mid-Miocene, it is reasonable to suggest the possible presence of detachments beneath Yucca Mountain. The NRC staff is concerned because recent publications (Scott, 1986; Scott and Rosenbaum, 1986) have suggested that detachment faulting may be a much more important element in the tectonic setting of Yucca Mountain than previously believed and because the implications of these features with respect to associated normal faults which intersect and bound the repository site have not been adequately addressed in the final EA. The NRC staff considers that omission from the final EA of the possible implications of detachment faulting and related listric normal faulting at Yucca Mountain reflects inadequate recognition of current uncertainties regarding the nature and rates of faulting during the Quaternary.

Scott (1986) implies that normal faults present at Yucca Mountain are connected to and are imbricates from a detachment surface at the Tertiary-Paleozoic boundary (depth of approximately 2 km). Moreover, to the northwest of Yucca Mountain, Hardyman (1984) has observed detachment surfaces at the Tertiary-pre-Tertiary contact and at most contacts throughout the Tertiary section. He also notes that high-angle shear planes can become quite common (several per meter) above detachment surfaces (Hardyman, 1984, page 196). The NRC staff is concerned that if detachment-type faulting is present at Yucca Mountain as has been reported by Scott (1986), then many unrecognized detachment surfaces may be present within the Tertiary section and there is potential for shattering of the units above the detachments.. In addition, based on hydrofrac stress tests (Stock and others, 1985) normal faults on Yucca Mountain are at or close to a state of failure. If normal faults on Yucca are functionally associated with detachment surfaces, then the detachment along which they are connected may also be at or close to failure. Slip along a normal fault could then occur along a much more areally significant structure (i.e., the detachment) than previously believed. A discussion of the implications of this style of fault movement at Yucca Mountain is lacking in the final EA.

Comment 4

Hydrothermal Activity - (Draft EA Major Comment 2)

Guideline on Tectonics (10 CFR 960.4-2-7) (b). (C)(1)

NRC major comment 2 on the draft EA for Yucca Mountain raised the concern that the mean probability estimate for disruption of the repository by igneous or tectonic activity was not supported by the information provided in the draft EA. That probability formed much of the basis in the draft EA for the conclusion that there is less than one chance in 10,000 over the next 10,000 years of igneous activity or tectonic processes leading to release of radionuclides to the accessible environment. In addition, NRC major comment 2 raised the concern that the potential for hydrothermal activity, which is often associated with volcanic activity, was not considered in the draft EA. Examination of the final EA indicates recognition of current information which suggests that the probability of occurrence of a volcanic event at Yucca Mountain in the next 10,000 years could conservatively be estimated as exceeding one chance in 10,000 (final EA, Section 6.3.1.7.3, pages 6-262 and 6-263). However, the potential for associated hydrothermal activity and hence the potential for such activity to create new flow paths and adversely affect waste package corrosion and waste form dissolution is not addressed in final EA Volumes I and II and is inadequately addressed in final EA Volume III, Section C.5.7, pages C.5-41 and C.5-42.

Final EA Volume III, Section C.5.7 states that hydrothermal activity is thought to be an "unimportant contributor" to recent volcanic events near and at Yucca Mountain and further states that "should studies conducted during site characterization alter this perception, these processes will be considered." These comments indicate that hydrothermal activity is not recognized as a phenomenon needing study early in site characterization and overlook several lines of evidence suggesting that hydrothermal activity may have been present in the vicinity of Yucca Mountain during the Quaternary (Swadley et al., 1984) and may still be a factor in the area. Evidence suggesting hydrothermal activity includes: elevated water temperatures in drill holes near Yucca Mountain (draft EA, page 3-22; final EA, Section 3.2.4.1, page 3-23; Sass et al., 1980; Szabo and Kyser, 1985; Carr, 1982); hydrothermal alteration in rocks underlying the Paintbrush Tuff (draft EA, pages 6-216 and 6-217; final EA, Section 6.3.1.6.2, page 6-254 and Section 6.3.1.6.4, page 6-256); and calcite-silica vein deposits exposed in trenches CF1 (Swadley and Hoover, 1983) and 14 (DOE, 1986). If the latter are shown to be hydrothermal, they may indicate relatively recent upward movement of hydrothermal solutions. In addition, in the Wahmonie area, approximately 25 km east of Yucca Mountain, a subsurface granite mass was eliminated as a potential repository based, in part, on the presence of hydrothermal alteration and a spring deposit at that site (draft EA, page 2-14; final EA, page 2-14; Twenhofel, 1979).

Hydrothermal activity at the proposed Yucca Mountain repository site and the accompanying upward movement of heated waters could adversely affect waste isolation capabilities of the repository by opening new pathways for groundwater and the accompanying radionuclides to reach the accessible environment. The effects of the heated waters or vapors could also adversely affect performance of the waste package by significantly increasing corrosion rates of the waste package and dissolution rates of the waste form, resulting in more rapid waste package failure and in release of large amounts of radionuclides to the accessible environment earlier than calculated in the final EA.

Comment 5

Natural Resources Data Relevant to the Evaluation - (Draft EA Detailed Comment 6-94)

Guidelines on Human Interference 10 CFR 960.4-2-8 and Natural Resources 10 CFR 960.4-2-8-1(b)(1), (c)(1), (c)(4), (d)(2)

NRC staff detailed comment 6-94 on the draft EA for Yucca Mountain raised concerns that the analysis of historical mining and prospecting in the area of Yucca Mountain is not sufficient to assess economic potential inasmuch as natural resource exploration has been banned within the Nevada Test Site for over 30 years. Examination of the final EA indicates that several references have been added (Section 6.3.1.8.2, page 6-281, first paragraph; page 6-285, first paragraph; page 6-287, second paragraph) to show what work has been conducted at the Nevada Test Site in the past 30 years; however, arguments in support of the conclusion that "Yucca Mountain has no energy or mineral resources for which economic extraction is potentially feasible in the foreseeable future" (final EA, Section 6.3.1.8.4, page 6-288) do not recognize the direct knowledge currently available about natural resources at Yucca Mountain and overlook various indirect lines of evidence suggesting that there may be significant economic natural resource potential there. The NRC staff is concerned that the final EA does not recognize that the limited data base currently available permits alternate interpretations of the possibility of economically motivated postclosure human-interference activities that could adversely affect the isolation capabilities of the Yucca Mountain site.

None of the new references presented in the final EA support the conclusions cited in the preceding paragraph, although final EA Volume III, Section C.4.1.1, page C.4-7 and Section C.5.8, page C5-49 state that for natural resources "cores and cuttings... are routinely analyzed by geochemical methods...; no mineralization has been found of economic importance;" and that "field exploration and geologic mapping were conducted." To the NRC staff's knowledge no geochemical or geophysical data sufficient to delineate anomalies have been presented in reports on Yucca Mountain and vicinity. Conclusions related to mineral potential at the Yucca Mountain site are based on the studies of Bell and Larson (1982) and analyses of drill hole data presented in Maldonado and Koether (1983) and Spengler and others (1981) (final EA, Section 3.2.4, page 3-23). The contents of the reports by Maldonado and Koether (1983) and Spengler and others (1981) suggest those studies were conducted to determine the structure, stratigraphy, and petrographic features of local Tertiary volcanics and not necessarily for the purpose of resource assessment. Studies to assess natural resources should include assays, trace element analysis, and geophysical exploration methods. Surficial mapping, while of primary importance, is not sufficient to delineate "hidden" mineral deposits and must be combined with detailed geochemistry and geophysics.

Volume III, Section C.5.5, page C.5-50 of the final EA cites McKee (1979) as indicating that "of 93 mining districts in Nevada with $1 million or more production of gold, silver, copper, lead, zinc, mercury, antimony and iron, only 2 are within calderas, and only 5 are in silicic tuffs related to calderas" and that "93 percent of all the major metal-mining districts in the state are in rocks other than silicic tuff." These statements were used in the final EA (page C.5-50) to justify a negative correlation between calderas and ore deposits in Nevada. Of the five districts in tuffs identified by McKee (1979) it is important to note that three of the five (Divide, Goldfield, and Bullfrog) are within approximately 90 miles of Yucca Mountain and at one (Bullfrog, approximately 22 miles from the site) ores are associated with two lithologic units which are also present at the Yucca Mountain site, namely the Paintbrush and Timber Mountain Tuffs (Christiansen and others, 1977; McKee, 1979). Many ore deposits in Nevada in addition to those cited by McKee (1979) are associated with andesitic and rhyolitic tuffs. These include the Santa Fe, Rawhide, Borealis, Ivanhoe, Sixteen-to-One (Lowe and others, 1985) and two recent discoveries, Hog Ranch and Paradise Peak (Robert Schafer, Billiton Exploration, Pers. Comm.; Thomason, 1986). Therefore, although a significant correlation between mining districts and calderas cannot yet be demonstrated, a correlation can be shown between volcanic rocks, specifically silicic tuffs including units present at Yucca Mountain, and ore deposits in Nevada.

Yucca Mountain, due to its proximity to known mining districts (Bullfrog, 22 miles west; Bare Mountain, 10 miles northwest; Lee, 9 miles southwest; Amargosa, 6 miles southwest; Wahmonie, 12 miles east; and Mine Mountain, 15 miles northeast, (page 6-296, final EA)) could be interpreted as a possible exploration target. Of these mining districts, the Bare Mountain and Amargosa are still active and the Wahmonie and Mine Mountain are located within the Nevada Test Site. Reports on the Wahmonie area suggest that site may still be an "attractive" exploration target (Smith and others, 1983; Ponce, 1981; Hoover and others, 1982). Smith and others (1983) suggest that areas within the Bullfrog district may have bulk mineable gold potential. The Sterling Mine, in the Bare Mountain district and approximately 9 miles from Yucca Mountain, is currently in production with calculated gold reserves totaling $12 millon dollars ($350.00 oz. gold) (Smith and others, 1983; Lowe and others, 1985). Carr and Parrish (1985) suggest that Crater Flat may represent a caldera. If Crater Flat is a caldera, the Sterling Mine on the west side of Crater Flat may be located along a caldera rim suggesting that the potential for exploitable resources may also exist along the western flank of Yucca Mountain along what would be the eastern rim of the suggested Crater Flat caldera. Perceived potential, as well as known resources, should be assessed to determine the probability of post-closure human interference on or near the proposed Yucca Mountain site.

New techniques, models and methods for exploration and mining have evolved in the past 30 years since natural resource exploration was banned at the Nevada Test Site. For instance, the concept of bulk mineable gold deposits only began in the early 1960's with the discovery of the Carlin Mine. Also, the suggestion that an area has no economic potential if there exists no previous history of successful mining can be shown to be without merit. The recent large gold discovery at Hog Ranch in northwestern Nevada is located in an area with no nearby precious metal occurrences. In order to establish or conclude that an area is barren of exploitable economic deposits, detailed studies incorporating new techniques, models and methods would need to be conducted.

Many economic mineral deposits in Nevada are hydrothermal in origin with ore placement controlled by fault zones (Lowe and others, 1985). Possible hydrothermal deposits (NRC, 1984; DOE, 1986) have been recognized in fault zones at or near Yucca Mountain. Additionally, the proposed site is bounded on the west by the large Solitario Canyon fault which is characterized by a wide zone of highly brecciated rock. The ore at the Sterling Mine (east side of Bare Mountain) is located in breccia zones along a thrust fault and rocks which underlie the ore zone are silicified from hydrothermal fluids (Smith and others, 1983). Breccia zones within faults provide excellent conduits for ore placement by hydrothermal processes suggesting that the Solitario Canyon fault and other faults at or near the Yucca Mountain site should be thoroughly explored. The potential for undiscovered resources exists in these fault and possible hydrothermal zones. These geologic characteristics of the area at Yucca Mountain (Tertiary volcanics, possible hydrothermal, faults), taken in combination with the previously mentioned proximity to areas of economic resoures and the aforementioned lithologic and structural similarities of the Yucca Mountain area to areas hosting known mineral deposits, indicate a potential for undiscovered natural resources.

Comment 6

Radionuclide Transport Increase Due to Changes in Geohydrologic and Climatic Conditions - (Draft EA Major Comment 8)

Guidelines on Geohydrology 10 CFR 960.4-2-1(c)(1) and Climate Changes 10 CFR 940.4-2-4(c)(2)

In the NRC staff major comments on the draft EA for Yucca Mountain it was noted that although groundwater velocities may be substantially increased as a result of plausible future changes in geohydrology and climate, the significance of these changes relative to increased radionuclide transport was dismissed because of the implied ability of geochemical retardation to limit radionuclide transport to the accessible environment. The concern was raised that because the ability of the geochemical system to effect sufficient retardation is highly uncertain, it is not reasonable to assume significant increases in radionuclide transport to the accessible environment due to changes in climate or geohydrologic conditions will not occur at Yucca Mountain solely as a result of retardation. Examination of the final EA indicates that while increased flux and recharge during pluvial conditions is acknowledged and discussed thoroughly (Section 6.3.1.1.4, pages 6-141 to 142; Section 6.3.1.4.3, pages 6-233 to 6-239), the conclusion that geochemical retardation will limit radionuclide transport to the accessible environment to an extent that there would be no significant increase in transport of radionuclides to the accessible environment is maintained (Section 6.3.1.4.4, page 6-242) without indication that there has been a re-evaluation in light of that discussion.

Neither the guidelines nor the final EA presents a quantitative definition for the term "significant." However, a change in flux of less than one order of magnitude--plausible based upon final EA estimates that recharge rate at Yucca Mountain could increase by a factor of 15 over modern rates (final EA, Section 6.3.1.1.4, page 6-142)--can affect calculated velocity by more than one order of magnitude. Therefore, the NRC staff considers plausible future changes in climate and geohydrology as significant. This, coupled with existing and unresolved uncertainty in retardation (particularly the contribution of matrix diffusion: refer to Comment 8) leads the NRC staff to conclude that the concern expressed in the original major comment is still valid.

Comment 7

Groundwater Travel Time - (Draft EA Major Comment 3)

Guidelines on Geohydrology 10 CFR 960.4-2-1(d), (b)(1) and (b)(5)(iii)

In the NRC staff major comments on the draft EA for Yucca Mountain it was noted that because of a series of technical concerns identified during the review, DOE's confidence in calculated groundwater travel time, which was used with regard to findings concerning the disqualifying condition of 1000 years groundwater travel time and the favorable condition of greater than 10,000 years groundwater travel time, was questioned. Many assumptions, hypotheses, and approaches used in the analysis did not incorporate uncertainties associated with available data. For example, the possibility of fracture flow was not factored into the calculations; plausible alternative conceptual models of water migration through the unsaturated zone were not included in the analysis; and single values for key hydrologic parameters in the calculations were used rather than a range of values. In addition, it was noted that the conclusion that a geologic unit which would divert downward infiltration of water beyond the limits of emplaced waste is present was not supported adequately by information presented. Therefore, it was recommended that existing field and laboratory data and experiments, including those concerned with spatial and temporal variability of the hydrologic system at Yucca Mountain, as well as other sources of uncertainty, be considered in revised assessments of the groundwater travel time.

Examination of the final EA indicates that the original conclusion concerning diversion of downward infiltration away from the buried waste is no longer maintained (final EA, page 6-138, 3rd paragraph), because of a current lack of conclusively supporting information.

Further review of the final EA indicates that the analysis for groundwater travel time has been revised significantly in an attempt to incorporate uncertainties identified in the NRC staff major comment on the draft EA (NRC major comment 3 in Hydrogeology). For example, ranges in values for some hydrogeologic parameters are considered (final EA, Table 6-18) as well as the possibility of fracture flow. However, the NRC staff has concerns with the revised assessment for groundwater travel time in the areas of input data to the model and the subsequent statistical analyses. A brief description of specific problems that bear upon the findings in the final EA is given below.

1. Uncertainties affecting groundwater travel times--general: The computational procedures used in the final EA to generate a frequency distribution for predicted groundwater travel times can incorporate only the estimated uncertainties in those parameters input to the model as random variables. Uncertainties in those parameters treated as constants, uncertainty about the defensibility of the conceptual model, uncertainty about the validity of the boundary conditions, and uncertainty about some of the assumptions used in the mathematical flow model are not accommodated in the analysis which generated the frequency distribution for predicted groundwater travel times.

2. Uncertainties with parameters input to model as random variables: Probability distributions were estimated for hydrogeologic parameters treated as random variables (saturated matrix conductivity, porosity) by using subjective judgment and the results of tests on core specimens. However, the specific types of input distributions used to characterize the random variables are not listed in the final EA. This information may be contained in a supporting document cited in the final EA as Sinnock and others (1986), which was not available to NRC staff during review of the final EA. The NRC assumes, based on the range of data presented in Table 6-18, that the saturated hydraulic conductivity of the rock matrix was considered in the analysis to be lognormally distributed and that the porosity of the matrix was considered to be distributed in some type of symmetrical fashion (probably as a normal or uniform distribution). The NRC cannot evaluate these assumptions or considerations without listings of testing results and written documentation to support the parameter means and standard deviations reported in Table 6-18. There is also some confusion with the use or presentation of median and mean values of hydraulic conductivity in Table 6-18 (the given equation calculates median saturated hydraulic conductivity, but the results are given as mean saturated hydraulic conductivities), which may adversely affect use of data or interpretation of results for groundwater travel time.

3. Uncertainties Regarding Vertical Movement of Groundwater: Groundwater travel time values are critically dependent on whether matrix flow or fracture flow will dominate from the repository to the water table; that in turn depends primarily on three factors: (1) the vertical flux of water infiltrating from the repository to the water table, including the possibility of concentration of the flow along certain pathways; (2) the saturated hydraulic conductivity of the rock; and (3) the fraction of saturation at which flow changes from matrix to fracture flow. These three factors are elaborated upon below.

Flux

In the draft EA, the geometric mean saturated hydraulic conductivity of 1 mm/yr was used as the upper bound for flux for groundwater travel time calculations through the unsaturated zone. In NRC comments on the draft EA the choice of this value as an upper bound was considered to be inadequately supported and the suggestion was made that higher values be considered. In the final EA this value has been reduced to a constant value of 0.5 mm/yr (final EA, pages 6-150 to 6-153), a value supported by Wilson (1985), who uses two sources of information to arrive at this number: 1) data from in situ level of saturation values combined with capillary pressure-saturation data from Peters (1984); and 2) data from an empirical method of determining the ratio between recharge and precipitation rates in arid regimes.

The first of these methods appears to be reasonable, but the NRC is not able to verify independently the 0.5 mm/yr as a "conservative" upper bound because no other data are available. The second method, which also seems reasonable, suggests a wide range of possible recharge values at the Yucca Mountain site of between 0.45 and 1.5 mm/yr, which does not appear to support robustly the estimate of 0.5 mm/yr presented in the final EA. The NRC staff concludes that the uncertainty in the values of flux has not been adequately considered in the analysis of groundwater travel time.

The importance of taking into account uncertainties in flux values is emphasized by considering how a small change in flux affects groundwater travel times at Yucca Mountain. If the value of flux is less than the matrix saturated conductivity in the Topopah Spring unit, it is assumed that flow does not occur in the fractures, thereby resulting in a large (greater than 40,000 year) groundwater travel time. Conversely, if flux exceeds the saturated matrix conductivity in all rock units between the repository and the water table, fracture flow may result in relatively short groundwater travel times (less than 1000 years). As a specific example, if the flux is assumed to be 0.67 mm/yr rather than 0.5 mm/yr, then more than half of the model elements in the Topopah Spring welded unit would be expected to experience fracture flow, and the overall predicted groundwater travel times would be decreased considerably by this very slight increase in flux.

Another point related to uncertainties in flux values is that calculated groundwater travel time distributions are based on a one-dimensional model, restricted to the vertical dimension. All infiltration is assumed to occur uniformly across the vertical column. This does not allow for the possibility that there are preferential paths along which flow could concentrate. Phenomena such as "fingering" have been observed to occur in unsaturated porous media, leading to much faster movement of water in the vertical direction than would be indicated by uniform infiltration. Even a slight concentration of infiltration could significantly reduce groundwater travel time, because of its great sensitivity to flux. In this case, spatial uniformity in the lateral direction is the most optimistic assumption.

Saturated Hydraulic Conductivity

The NRC agrees in principle with the analysis of saturated hydraulic conductivity for matrix and fracture flow (final EA, pages 6-153 to 6-162). However, it must be recognized that the wide variation in saturated hydraulic conductivity values (0.03 to 14.2 mm/yr) reported by Peters et al., (1984) indicates that there may be significant zones in the Topopah Spring unit where the matrix saturated hydraulic conductivity is less than 0.5 mm/year. If such values occur throughout the entire depth of the unit, fracture flow could occur at flux values less than 0.5 mm/year thereby producing groundwater travel times of substantially less than 1000 years in certain areas of the Topopah Spring unit. Therefore, the possible spatial variability of saturated hydraulic conductivity must be adequately considered in combination with the uncertainty in the assumed value of flux in the analysis.

Transition between Matrix and Fracture Flow

The analysis in the final EA assumes that fracture flow is initiated when flux exceeds 95 percent of the saturated hydraulic conductivity of the rock matrix (final EA, page 6-153, last paragraph), but no rationale for this assumption is provided. The NRC is concerned about the justification for the use of this 95 percent value; furthermore, it is even more concerned that no sensitivity calculations were conducted (or at least none were reported) that would reveal the extent of the influence of choosing this percentage on the distribution of predicted groundwater travel times. Conceivably, this percentage could have been treated as a random variable in order to provide an analysis of uncertainty in the identification of the transition point from matrix flow to fracture flow.

4. Uncertainties related to intercorrelation of hydrogeologic properties: Hydrogeologic properties such as hydraulic conductivity and porosity are expected to be correlated; e.g., if porosity is larger, hydraulic conductivity is likely to be larger, all other things being equal. In addition, hydrogeologic properties are expected to be correlated spatially; e.g., measurements taken in close proximity are likely to be more similar than measurements separated by a large distance. Intercorrelations between hydrogeologic properties were not studied, evaluated, or used in the analysis of predicted groundwater travel time. Data sufficient for these more complicated studies may not exist; however, an effort to describe, at least subjectively, the probable intercorrelations and spatial correlations among the hydrogeologic parameters could have been made. By so doing, the potential effects of these correlations and intercorrelations on groundwater travel time predictions could have been evaluated. This might be especially important in the case of the vertical spatial correlation of saturated hydraulic conductivity, discussed further in the following section (#5).

5. Uncertainties in methods of analyzing groundwater travel times: The analysis of groundwater travel time in the final EA relied on a model, Method 1, in which the vertical layer spacing was 10 ft (final EA, page 6-153, third paragraph). The final EA also presents a second analysis for groundwater travel time, Method 2, (final EA, page 6-160, last paragraph) in which each hydrogeologic unit (some of which are hundreds of feet thick) represents one layer. The claim is made that Method 2 is more conservative than Method 1 because "as more physical realism is introduced into the travel time model, the range of travel times is likely to be compressed. Moving from Method 2 to Method 1 clearly has the effect of removing the low probability, extreme values in the tails of the frequency distribution of travel times from the disturbed zone to the water table" (final EA, page 6-162, third paragraph). The final EA concludes that Method 2 gives a more conservative groundwater travel time for small percentiles of the cumulative distribution function (CDF). On the other hand, Method 1, which is supposedly more realistic, suggests that there is only a low probability that the groundwater travel time is less than 10,000 years.

   These conclusions reached on the comparison of the results of Methods 1 and 2 in the final EA (Figure 6-9, page 163) are questionable. The stated increase in realism of Method 1 over Method 2 is probably a mathematical artifact. It can be demonstrated that as the layer thickness is diminished (as it is in Method 1 vis-a-vis Method 2), and if the properties of the layers remain spatially uncorrelated (as they are in Method 1), the groundwater travel time would approach a constant for each vertical column. Given this artificially-induced compressive effect, Method 2 is in fact more likely to encompass the correct distribution than Method 1.

6. Uncertainties in use of simulated groundwater travel time distributions: The NRC staff is concerned with how the distribution of groundwater travel time was used to evaluate the conclusions regarding travel times in the final EA. The conclusions were based on central tendencies (mean and median) of the simulated groundwater travel time distribution. Analyses using percentile criteria smaller than the mean or median would more properly reflect the high degree of uncertainty present in the groundwater travel time distributon.

   In support of the analyses leading to groundwater travel times in excess of 10,000 years, the final EA states (page 6-131, second paragraph) that "the extreme upper and lower portions of the travel time distribution are characteristic of travel times along unlikely paths of radionuclide travel, and therefore, inappropriate for evaluating this favorable condition (10,000 year groundwater travel time). The DOE considers this judgment to be consistent with the NRC staff position regarding the groundwater travel time requirement in 10 CFR Part 60 (Browning, 1985)." Although the NRC does anticipate excluding the extremes of the distribution of possible groundwater travel times in determining whether the performance objective has been met, excluding the tails (extremes) of a distribution is not equivalent to a choice of the mean or median as the measure of the groundwater travel time. This is particularly so for initial screening prior to site characterization, where attempting to reach conclusions about "likely" and "unlikely" flow paths is speculation at best. Indeed, eliminating the tails of the groundwater travel time distribution virtually requires ignoring the uncertainty that the analyses were intended to incorporate. In addition, the mean or median may be particularly poor choices of a criterion for the groundwater travel time distribution because of their relative insensitivity to modeling assumptions such as sampling methods and spatial correlations. The meaning of the NRC statement (Browning, 1985) that refers to excluding extremes is simply that the NRC might consider the performance objective to be met even if some small portion of the distribution was less than the time criterion (e.g., 1000 years), assuming the conceptual model and other determining factors behind the distribution itself are defensible.

Comment 8

Retardation of Radionuclides

Guideline on Geochemistry (10 CFR 960.4-2-2): (b) Favorable Conditions 2, 5

In the NRC staff major comment 6 on the draft EA for Yucca Mountain, the concern was raised that the retardation factors used in determining radionuclide releases were inappropriately large in assessing the effectiveness of geochemical processes affecting radionuclide retardation. In the final EA two mechanisms--matrix diffusion and sorption--are described which, if operative in the repository system, would diminish radionuclide releases to the accessible environment. In response to the NRC major comment on the draft EA, new evidence is presented in the final EA to support the position that matrix diffusion and sorption will play an important role in controlling radionuclide release. However, the NRC staff considers that the new evidence inadequately supports the conclusion that retardation of several key actinides by these mechanisms will occur.

Retardation of radionuclides by matrix diffusion in the fractured rock of Yucca Mountain is described in the final EA (Section 6.3.1.2.3.(2), page 6-177) and supported by the final EA reference (Travis et al., 1984). In this reference it is shown that in a fractured rock with low matrix permeability and interconnected pores, retardation factors can be as large as 400 for nonsorbing species and several thousand for sorbing species when these species are in solution. From the description in Travis et al. (1984) the fractured rock studied may be analogous to the reference repository host rock, the Topopah Spring Member. However, the scenario described in this reference does not consider how radionuclide release would be affected if the radionuclides were present as colloids or pseudocolloids rather than dissolved species. Based on the comparison of individual radionuclide inventories versus their EPA limits at 1000 years, the important radionuclides of nuclear waste are actinides (Kerrisk, 1985). The actinides, when leached from a glass waste form, are expected to occur as colloids (final EA, Section 6.3.1.2.3.(2), page 6-189); therefore, the effect of colloids on matrix diffusion in fractured rocks needs to be considered when evaluating how much credit can be taken for retardation by this mechanism.

The final EA does describe how radiocolloids can contribute to retardation in rocks in which porous flow will occur, such as the unsaturated tuffaceous beds of the Calico Hills unit, by being mechanically filtered from the flowing liquid (Section 6.3.1.2.3.(2), page 6-191). The final EA proposes that mechanical filtration will occur because some of the colloids will be bigger than some of the pores through which the fluid is flowing. However, if colloids are present in the fluids flowing through fractured rock, two scenarios are possible that could lessen the effectiveness of matrix diffusion for retarding radionuclide transport:

1. Colloids, which can range in size up to 10 um (Stumm and Morgan, 1981), might be too large to pass into the pores of the matrix. In such cases, colloids would remain in the fluid flowing in the fractures and retardation would be decreased.

2. Colloids, partly because of their large size, can have diffusivities several orders of magnitude lower than those of dissolved ions in water (Weast, 1971). Therefore, compared to ions, large particles such as colloids will have much less tendency to diffuse into the matrix (Cathles et al., 1974).

In the final EA, sorption is the second mechanism given credit for retarding the release of radionuclides from the repository. In response to the NRC major draft EA comment regarding sorption, the final EA refers to new data from Rundberg (1985) which suggests that for simple cations (Sr, Cs, and Ba) sorption parameters determined from batch tests using crushed solids are in good agreement with sorption parameters obtained from corresponding tests with intact solids. The NRC staff finds this information unconvincing for the following reasons:

1. According to Kerrisk (1985), the important radionuclides in nuclear waste are not the simple cations listed above but instead are the actinides such as Am, Pu, U, and Np which can exist in more than one form (simple ions, complex ions, and colloids) in groundwater. Nyhan et al. (1985) present field evidence for multiple forms of actinides in groundwater below a liquid waste disposal site where significant quantities of Pu and Am were mobilized when water was allowed to flush through the system. Kelmers (1984) describes how sorption parameters from batch tests only average the sorption of the multiple species of a given radionuclide. The sorption parameter underestimates the amount of sorption for the strongly sorbed species but overestimates the amount of sorption for the weakly sorbed species.

2. Rundberg (1985) does not attempt to correlate between sorption parameters for actinides derived from tests using crushed and intact rock. In fact, he states that for americium and plutonium "the sorption mechanism is not known nor is the chemical form of plutonium and americium in neutral pH solutions known with any certainty" (Rundberg, 1985, page 19). This implies that at this time no meaningful correlation between the batch experiments on crushed tuff in the laboratory and the field situation with the intact tuff would be possible.

3. No correlation is apparent in Rundberg's experiments between the amount of actinide sorbed and the proportion of sorbents (zeolites and clays) in the solids. Therefore, zeolites and clays have not been shown to be effective sorbers of Pu and Am.

4. Rundberg (1985) states that precipitation, which would yield an apparent sorption ratio, cannot be ruled out in the batch measurements. If precipitation instead of sorption has occurred in the batch test, retardation is not proven. In such a case, concentration of a radionuclide species in the solution would be limited by the solubility of the radionuclide-bearing solid and insensitive to the presence of the other solids in the substrate. For example, if precipitation occurred in a batch test using a nonsorptive solid and a radionuclide-bearing solution, an "apparent sorption ratio" could be determined. This "apparent sorption ratio" could be erroneously inserted into the equation for calculating the retardation factor. However, if the liquid from the batch test was then decanted into a column containing the same nonsorptive solid, the concentration would be below the solubility limit (i.e., no additional precipitation would occur) and the radionuclide would travel down the column as fast as the liquid (no retardation). Thus, if precipitation is not disproved in a sorption test, credit cannot be taken for retardation of the radionuclide.

Given these concerns with the new information introduced in the final EA to support the assessments of geochemical factors affecting radionuclide transport, the NRC staff is concerned that those assessments do not fully recognize the uncertainties in the data currently available.

Comment 9

Waste Package Post-Closure Performance - (Draft EA Major Comment)

Guidelines on Post-Closure 10 CFR 960.4-1, 960.4-2-1(a) and 960.4-2-2(a)

In the NRC major comment 10 on the draft EA for the Yucca Mountain site the concern was raised that the performance analysis of the engineered barrier system was based on insufficiently supported assumptions concerning waste package failure modes and radionuclide release rates and that the uncertainties associated with the assumptions were not adequately conveyed. The comment suggested that the final EA consider more realistic assumptions in the reference case preliminary performance analysis and provide an estimate of the impact of uncertainties on the result of the analysis or reconsider the summary statements made in the draft EA. Examination of the final EA (Executive Summary, Section 6.2, page 18, third paragraph; Section 6.4.2, pages 6-364 to 6-388) indicates that some revisions have been made to identify areas of uncertainty which are to be addressed during site characterization (Sections 6.4.2.1.1, page 6-367, paragraph 3, and 6.4.2.2.2, page 6-374, first paragraph); however, the consequences of the current uncertainties on the analyses of waste package lifetime and radionuclide release rate have not been addressed and hence there is limited recognition that the current data base permits alternative analyses.

Although the final EA may imply that the assumptions used to make evaluations regarding the engineered barrier system are the best estimate of realistic conditions based on the current DOE data (Sections 6.4.2.2.1, page 6-372, first full paragraph, and 6.4.2.2.2, page 6-373, first paragraph), many of the assumptions are currently unsubstantiated and the range of uncertainties not considered when making the evaluations. For example, while it may be true that corrosion testing performed for the last couple of years in a Yucca Mountain simulated environment has not yet identified an operable corrosion mechanism other than uniform attack (Section 6.4.2.1.1, page 6-369, continuing paragraph), the historical susceptibility of the austenitic stainless steels to stress-assisted cracking in chloride/oxygen/water (steam) environments raises significant questions as to their long-term performance. Furthermore, based on the recent test results contained in NUREG/CR-4619, which indicate evidence of crack initiation for a range of simulated Yucca Mountain environments, the NRC staff cannot at this time accept a 3000 year container life as a realistic or conservative value. Until the prediction of the waste package lifetime is justified and the effects of input parameter and model uncertainties are accounted for, the possibility exists that the current analysis in the final EA may greatly overestimate the waste package lifetime.

The NRC staff is also concerned that the efforts made in the text of the final EA to more fully acknowledge the uncertainties in the analyses were not reflected in the discussion contained in the Executive Summary. In fact, the parenthetical sentence contained in the draft EA Executive Summary (op. cit.):

> "There is an issue as to the rate of corrosion in the unsaturated zone; it will be addressed further during site characterization;"

was deleted in the final EA, thereby strengthening the implication that a 3000 year containment lifetime is both realistic and conservative.

NRC staff concerns regarding waste package performance modeling and the effects of input parameters and model uncertainties on the waste package lifetime predictions have not been alleviated in the revision of the draft EA. The NRC staff considers that major comment 10 applies to the final EA.

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ATTACHMENT 2

NEVADA'S STATEMENT OF POSITION

RE: SHORTCOMINGS IN THE REPOSITORY PROGRAM

PREDETERMINED SELECTION OF SITES

The selection of Yucca Mountain in the State of Nevada (as well as Hanford in the State of Washington), by the Department of Energy (DOE) for site characterization was actually made long prior to the passage of the Nuclear Waste Policy Act (NWPA). The Department's actions since passage of the NWPA have merely served to confirm that predetermined selection. The site selection process that the Act requires, which was designed by Congress to insure objectivity and adherence to some technical criteria, has been manipulated to insure that its predetermined choices would be maintained. Nevada has enunciated this concern to the Department on several occasions, most notably in Nevada's comments on the Draft Environmental Assessment for Yucca Mountain. (Attachment 2-A). The Department has not responded to these comments in any meaningful manner.

The Department, in its Environmental Assessments (EA), as well as in public testimony before the Congress and other bodies both before and subsequent to the issuance of the EAs, cites diversity of rock type as its primary justification for the selection of Yucca Mountain. That justification is, in the case of Yucca Mountain, entirely pretextual. Otherwise, why was granite not among the suite from which the sites for characterization was chosen?

THE SITING GUIDELINES ARE FATALLY FLAWED

The Department's site selection guidelines, the fundamental vehicle which Congress intended to insure the objectivity and sound technical basis for site selection in the entire program, are hopelessly flawed, and violate the fundamental standard adopted by Congress in the Act. They are incapable of objective application, but were rather designed to insure that none of the current sites would be disqualified early, thus maintaining the Department's predetermination in the selection of sites for characterization.

In adopting the guidelines the Department ignored relevant input from the states, tribes, and other interested parties. The guidelines themselves wholly ignore important areas, such as national transportation impacts, in the selection of the repositories. Nevada's concerns on this subject went unheard by the Department. They are summarized in Attachment 2-A. This problem is the subject of litigation in EPI v. Herrington, Ninth Circuit Cause No. 85-7854 and Consolidated Cases.

THERE HAS BEEN NO MEANINGFUL CONSULTATION AND COOPERATION WITH THE STATES

Despite Congress' intent, the repository program currently being implemented by the Department has many of the characteristics that foreshadowed problems from past efforts. The program is driven by a schedule that is itself propelled by a fixed and, some would argue, unrealistic target date. The framework by which siting and suitability decisions will be made, the siting guidelines, is overly general, lacking in specificity and capable only of subjective application.

There has been a breakdown in the institutional system of checks and balances that Congress so carefully wrought in the Act, and the cause of this failure stems directly from DOE's inability or unwillingness to understand the fundamental nature of the state/federal relationship established by the Act. Nevada has even repeatedly used the information-demand process contemplated by Section 117(a) of the Act with very poor results. The Department has chosen to pursue a project-oriented role with zeal. However, at the same time, it has attempted, at nearly every turn, to limit state involvement in order to thwart states' efforts to carry out their role under the Act. The Department refuses to recognize the oversight role of the states, which Congress found so essential, including technical oversight, and refuses to cooperate with, and adequately fund, that role. The Department spoon-feeds information of its choosing to the states and tribes and has consistently attempted to keep them at arms length. DOE has prohibited the states from attending meetings, from reviewing documents, and from any involvement in the decision-making process.

Unless balance is restored to this critical relationship the federal government will never be able to develop the level of public confidence essential to success in this controversial undertaking.

THE ENVIRONMENTAL ASSESSMENTS ARE INADEQUATE

The environmental assessments themselves, upon which the Department's nomination and recommendation of sites for characterization are based, are themselves totally inadequate under the Act.. In the case of Yucca Mountain the EA is based on incomplete, inaccurate, and sometimes manipulated data. Significant State input to and comments upon the EA have been totally ignored. (Attachment 2-A). The ranking methodology applied by the Department in selecting sites for characterization is itself flawed, and has been clearly manipulated in order, again, to justify the Department's predetermined selection of sites. This was confirmed by the Subcommittee on Energy Conservation and Power, of the Committee on Energy and Commerce investigation reported on October 20, 1986. (Attachment 2-B).

One document uncovered by that investigation showed that Yucca Mountain had 994 expected fatalities in the post-closure period whereas Davis Canyon, Utah had 32 and Deaf Smith, Texas 47. Yet Yucca Mountain was rated first in the Department's preference. (See Attachment 2-C).

DISCONTINUANCE OF SECOND REPOSITORY PROGRAM

In abandoning the second repository program, the Secretary of Energy has violated not only the clear letter of the NWPA, but its essential spirit as well. Fundamental to the passage of the Act was the concept of regional equity. In its abandonment of the second repository program, the Secretary has also abandoned this concept altogether.

At various congressional hearings Department officials have cited the lack of need for a second repository as the primary rationale for this unilateral decision, which even the Department's General Counsel now concedes to be illegal. The Department's own internal documents show clearly, however, that the decision to abandon the second repository search was based primarily, if not exclusively, on political considerations.

PREMATURE DETERMINATIONS OF SITE SUITABILITY

Together with the announcement of the selection of sites for characterization, on May 28, 1986, the Secretary also made a preliminary determination that each of the sites chosen was suitable for development as a repository. This further fuels Nevada's concerns that the Department is attempting to rig the selection process.

Congress intended, in Section 114(f) of the NWPA, to insure that, at the end of the site characterization, DOE would have three bona fide alternate sites from which to select one for development as a repository. Thus the requirement for the Secretary to certify that three sites were suitable for development as a repository after having been characterized (i.e. studied in detail and at the repository depth). Congress was concerned that, without such conditions, the Department might select a preferred site for characterization, along with two less suitable sites, in order that its preferred site would be the only site available after characterization. In order to reduce the likelihood that DOE would be able to choose a repository based on political and other non-technical criteria, Congress clearly intended to provide for three real alternatives from which to choose after testing and evaluation had been completed. A determination of suitability made prior to even the commencement of characterization simply serves to further convince the states that the entire process of selecting a repository is being skewed by the Department.

FUNDING STATE PARTICIPATION

In FY 1984, the Department denied Nevada's request for funding to engage in independent technical monitoring and analysis of the Yucca Mountain site. Nevada challenged DOE in the Ninth Circuit Court of Appeals. The court determined that the State was entitled to funding because of the "independent oversight role that Congress envisioned for the states." Nevada v. Herrington, 775 F. 2d 529, 536 (1985). (Attachment 2-D). Notwithstanding the court's order, DOE procrastinated funding the requested activities until after its May 28, 1986, announcement that Yucca Mountain would be characterized.

Even now the Department has refused to evaluate and fund Nevada's requests. Nevada's 1987 calendar year grant application was submitted in early October 1986. As of January 14, 1987, the Department had not evaluated the application sufficiently to advise Nevada what additional information may be required. Nevada now faces the likely possibility that the intended technical work will be compromised. The only conclusion is that DOE does not want anyone looking over its shoulder. Two relevant letters, dated December 19 and December 29, 1986, are attached and describe the current situation. (Attachments 2-E and 2-F).

ENVIRONMENTAL MONITORING

The Nuclear Waste Policy Act requires that the potential environmental impacts of site characterization be identified in a site characterization plan, and minimized throughout site characterization (Section 113(a)), and that the Department prepare an Environmental Impact Statement (EIS) after site characterization (Section 114(f)). The Department proposes to conduct all of its environmental analysis of activity at Yucca Mountain without first doing any site specific environmental study to establish the baseline from which impacts might be measured. This approach is unscientific and a probable legal defect in any subsequent EIS. The establishment of an environmental baseline before characterization begins and the site is disrupted would not slow down commencement of actual site characterization if it were started now. If the Department persists in its refusal to establish the current environmental conditions at Yucca Mountain, Nevada will seek funding to perform this same work.

CORRECTIONS NEEDED

The entire repository siting program is threatened with collapse. In order to avoid that outcome a restructuring of the entire program, consistent with the Act, is essential.

The Department should rescind its nominations and recommendations of sites for characterization, and the environmental assessments upon which they are based. Its siting guidelines should be withdrawn. New siting guidelines, based on sound technical criteria and capable of objective application, should be drafted by a body entirely independent of the Department of Energy. All interested parties, including the federal government, the states, affected Indian tribes, the nuclear industry, and environmental organizations, should be involved in drafting those new guidelines.

The new guidelines should then be applied, in a restarted nation-wide search, to all geologic media, including granite, to find a suite of sites for formal characterization which will provide the technical confidence that real alternatives will be available from which to select a site for the nation's first repository.

Anything less than a new start, with objective, workable guidelines based on sound technical criteria, will not be enough. To continue along the path which DOE insists upon traveling is to doom the entire process to failure. Unless we move to address the problems inherent in this entire process now, the country will have no solution to the problem of the disposal and isolation of nuclear waste, even by the turn of this century.

The CHAIRMAN. Thank you very much, Governor Sawyer, for a very thoughtful statement. We appreciate that very much.

Our next witness will be Mr. Curtis Eschels—did I pronounce that correctly, Mr. Eschels?

Mr. ESCHELS. Yes, sir.

The CHAIRMAN. Special Assistant to the Governor of the State of Washington.

STATEMENT OF HON. BOOTH GARDNER, GOVERNOR, STATE OF WASHINGTON AS PRESENTED BY CURTIS ESCHELS, SPECIAL ASSISTANT TO THE GOVERNOR

Mr. ESCHELS. I would like to thank you, Chairman Johnston.

My name is Curtis Eschels. I am a Special Assistant to Governor Gardner for Nuclear Matters and Energy. I would like to thank you especially for the early opportunity to address the Committee, acknowledging the assistance in that direction from Senator Evans of Washington, Senator Hecht of Nevada, and the other four Senators from the three States most directly affected.

Governor Gardner had to stay in the State of Washington principally because our legislature has just convened, and there are some major issues there also.

I have submitted a formal statement to the Committee Members, and I would like to highlight some of the points there according to your direction earlier.

The CHAIRMAN. Thank you very much. Your full statement will be put into the record.

Mr. ESCHELS. Thank you.

We agree that the entire site selection process for high level nuclear waste is at a critical juncture. We also agree that it is on the brink of collapse. Once it does collapse, we believe it would be much more difficult to put it back together.

We go on to say that we think it is wise to address the problem now, rather than wait until the courts have sent the entire process back to square one. In that regard, we were disappointed when we read the draft Mission Plan amendments that DOE offered. We agree with Governor Sawyer that the Plan simply acknowledges that DOE cannot have the first repository operating by 1998. It says we have slipped five years in the four years that we have experience under the Act.

Furthermore, I think that is a natural consequence of the decisions and the implementation of the Department in the last couple of years. I am not sitting here pretending that I have a guaranteed solution to that problem, but I will close by discussing a proposed course of action that we believe could be a starting point toward developing a concensus among the many parties which have an interest in ~~here and~~ are involved.

Before I get to that, I would like to discuss with you some of the reasons why we in Washington State are so adamant in our position that the selection process must be brought to a halt, that the May 28 decisions must be retracted, and the process must be restructured before it crashes.

We have two main categories: the second round decision, and the first round decision. I believe the members understand fully and personally the problems with the second round decision. I would only point out that we think they are symptomatic of the entire implementation.

Let me turn to the first round and point out some of the items that we have discovered and share those with you. When the Department selected Hanford as one of the sites to be characterized, it ignored the results of the ranking methodology which had been approved by the National Academy of Sciences Board for Radioactive Waste Management.

The Academy's Board did not review and did not approve the actual implementation, the process by which DOE used the results of that ranking methodology to select the three sites. Indeed, the results of the ranking methodology indicate that the Hanford site is the most costly and the least safe site of those five that were on the list at that time. Hanford ranks dead last in the preclosure characteristics and the post-closure characteristics in comparison of the sites.

Dr. Ralph Keeney is a nationally known and respected decision analyst. He is the co-author of that ranking methodology used by the Department. He was retained by DOE because of his experience in utilizing this methodology, and prior to the May 28 decision he recommended to the Department that the appropriate way to identify a suite or a set of three proposed sites to look at was to conduct what is called a "portfolio analysis."

Instead, DOE chose not to follow that recommendation and, in part because of that, subsequent to the Department's decision Dr. Keeney prepared and published a portfolio analysis on his own. That work was not funded by the Department. However, based on the portfolio analysis, Professor Keeney concluded that if three sites are to be characterized, they would be Yucca Mountain, Richton Dome, and Deaf Smith. That is the Department's consultant.

The Department also engaged the National Academy of Sciences, and they in turn retained a nationally respected decision analyst, Professor Detlof von Winterfeldt. Subsequent to the May 28 decision, Professor von Winterfeldt wrote a letter to Ben Rusche in which he commented as an individual on the DOE ranking methodology report on the one hand, and the recommendation report on the other.

Professor von Winterfeldt said that in his opinion the analysis in the ranking methodology report is sound, it is thorough, it is state of the art application. However, there is this discontinuity between the ranking methodology and the Department's recommendation.

On page 3 of my formal statement you will find what the professor said. I would like to quote it:

> In brief, says Professor von Winterfeldt, I believe that the conclusions drawn in the Recommendation Report are based on selective and misleading use of the analysis described in the Methodology Report. It is extremely hard to find in the Methodology Report any support for the selection of the specific set of three sites recomended for characterization. Instead, I find a convincing analysis that clearly rejects the Hanford site and, furthermore, supports the selection of the Richton Dome site over the Deaf Smith site. The way the Methodology Report was interpreted in the Recommendation Report, in my opinion, comes very close to a misuse of an otherwise excellent analysis.

That is the end of that quote. He goes on to say in his conclusion:

. . . The most important conclusion that I draw from the Recommendation Report's inclusion of the Hanford and Deaf Smith sites is that DOE is apparently willing to accept more health effects and an additional cost of $3.360 billion in return for several minor advantages of the two sites.

I will stop there, rather than driving the nail clear out of site. Neither of these two distinguished experts has an axe to grind in the selection of a repository site. They are both from California. Neither of them was under contract to any of the States that are involved. They both had been involved in the decisionmaking process. They each had a different role, and yet when the Department announced its May 28 decision, each of them felt compelled to go on the public record with their own analysis of the decision.

My testimony includes some results of consultants that were engaged by the State of Washington. It is there for your reading. They agree essentially with the Academy and with the Department's consultant that the final recommendation was a travesty of the decision ranking methodology.

This is a brief summary of some of the technical reports, some of the technical problems that we have with the Department's application of that ranking methodology. I would like to request permission to enter the full documents from which I have quoted excerpts into the Committee's record.

There are numerous, serious technical concerns which lead many people to believe that the direction of the Department's process at this point is not toward having a repository in this country. Those concerns, as Governor Sawyer has pointed out, are shared by the Nuclear Regulatory Commission staff. There is a good deal of overconfidence that is not warranted. There is a good deal of uncertainty that is not reflected.

We believe that it is time to consider a mid-course correction in the repository site selection process. The May 28 decisions, we believe, must be retracted. A serious attempt must be made to reach a concensus among the interested parties so that the process can be improved, and so that we do end up with a solution to what is truly a national problem.

The approach has to accomplish at least two things:

First, a timely solution to the nuclear utilities' short-term problem; and

Second, establishment of a site selection process designed to provide confidence that the search will be for the best site in this country, and that the selection decisions are going to be based on credible, scientific information.

We need a forum in which to begin discussion and development of this concensus. With this in mind, Governor Gardner has requested that the Department take the lead in organizing a nonbinding conflict-resolution process in which the representatives of all the interested parties would be invited to participate. A copy of his letter to the Secretary of Energy has been submitted with this testimony.

The process would be conducted not by DOE but by an independent, nationally known and respected conflict-resolution consultant. The Department, we believe, should participate in this process on the same basis as any other interested party.

As a prerequisite, we believe that each participant should take knowledge first that there is a need for a comprehensive review of the site-selection process to consider and discuss changes to increase the likelihood that we will have a repository and a permanent solution to the nuclear waste problem in this country.

In addition, I believe that there should be a commitment toward channeling energies toward development of an acceptable, workable solution, insteading of spending time discussing who is to blame, and pointing the finger. If DOE acknowledges that there is a need to consider changes to the process, and if it enthusiastically supports and participates in that concensus-building, its credibility would be enhanced, and there is a good possibility that positive results can be achieved.

If the Department is not willing to take these steps, then I recommend that the interested parties explore alternative means of establishing a forum to carry on this concensus-building process without the Department.

The goal of the Act which Congress passed is to site, construct, and operate a repository to contain high-level nuclear waste away from the environment and from our people for the next 10,000 years. We are seeking to protect the next 400 generations of humans from the potential dangers of waste produced by the 3 generations alive now.

If we can agree on an acceptable and workable solution to the nuclear utilities 'short-term problem, we should not be overly concerned that we have to back up a few months in the repository site-selection process in order to instill a confidence that is so necessary for the ultimate success.

I thank you again, Mr. Chairman, for the opportunity to give you our perspective on the implementation by the Department of the Nuclear Waste Policy Act so far.

[The prepared statement of Governor Gardner and a statement from John M. Poynor, Mayor of Richland, WA, follows:]

TESTIMONY OF GOVERNOR BOOTH GARDNER

STATE OF WASHINGTON

to

SENATE COMMITTEE ON ENERGY AND NATURAL RESOURCES

February 4, 1987

STATEMENT OF GOVERNOR BOOTH GARDNER

Thank you Chairman Johnston and members of the committee. I appreciate the opportunity to present this testimony on behalf of the citizens of the state of Washington.

We have reached a critical juncture in the high-level nuclear waste repository program. The site selection process is on the brink of total collapse. USDOE credibility is at an all time low. Unless some bold action is taken soon, the program will be brought to an abrupt halt by the courts. When that happens, it will result in conditions which will make it very difficult to put the program back together. I believe it would be wise to address the problem now, rather than wait until we are in a crisis situation.

We were disappointed that in the recently released draft amended Mission Plan, USDOE did not face up to the real problems in the site selection process. The draft simply reiterates USDOE's position and rationale on the MRS and on the second round indefinite postponement, and acknowledges what we and most others involved in the process have been saying for two years--that USDOE cannot have the first repository operating by 1998. USDOE has its head down and is attempting to charge forward while ignoring the problems which have resulted from its past actions.

I do not pretend to have any guaranteed solutions to the complex problems with which we are faced, but I would like to discuss a proposed course of action which I believe could be the starting point toward developing a consensus among the many parties involved in the process.

Before I discuss the proposed course of action, it is important that you understand some of the reasons why we in the state of Washington are so adamant in our position that the site selection process must be brought to a halt, the May 28th decisions must be retracted, and the process must be restructured before this program goes forward.

We, along with almost everyone involved in this program, were shocked when on May 28th of last year, USDOE unilaterally and arbitrarily announced that the second round site selection process had been "indefinitely postponed". This action is clearly in direct violation of the Nuclear Waste Policy Act. Our position on this issue is supported by USDOE's own legal counsel. In documents which USDOE reluctantly released to

Congressman Markey's House Subcommittee, there is a memorandum prepared for the USDOE decision-makers in which the staff advised that a decision to indefinitely postpone the second round would be seen as "an obvious political ploy". This advice was right on target. Unfortunately, USDOE decision-makers chose to ignore the advice. USDOE is not above the law and we believe the courts will make that point very clear.

In selecting Hanford as one of the three sites to be characterized, USDOE has ignored the results of the ranking methodology which was reviewed and approved by the National Academy of Sciences. The Academy did not review, nor approve, the process by which USDOE utilized the results of the ranking methodology to select the three sites for characterization. The results of the ranking methodology indicate that the Hanford site is the most costly and the least safe site of the five sites under consideration. Hanford ranks dead last in both the pre-closure and the post-closure comparisons of the sites.

USDOE says Hanford was selected to meet diversity of rock type requirements. However, in a draft of the USDOE ranking methodology report prepared just six weeks prior to the May 28th announcement, it was stated that the Yucca Mountain, Richton Dome, and Deaf Smith sites "offer maximum diversity in geohydrologic settings", and that their selection would "meet the minimum requirement for [rock type] diversity of the Nuclear Regulatory Commission".

In a subsequent USDOE draft, it was stated as follows:

> *"The clear implication from the composite analysis is that Yucca Mountain, Richton Dome, and Deaf Smith are the preferred set of sites for characterization. There are no realistic assumptions about either pre-closure or post-closure expected performance, or about the values used to evaluate performance that can result in Hanford being anything but the last ranked site. And the significance of the performance differences between Hanford and all the other sites is substantial. . . .Thus, it can be definitively stated that the results of the composite analysis strongly suggest characterization of the Yucca Mountain, Richton Dome, and Deaf Smith sites."*

Professor Ralph Keeney was a co-author of the ranking methodology utilized by USDOE. Dr. Keeney was retained by USDOE because of his experience in utilizing the methodology for similar or related problems. Prior to the May 28th decision, Professor Keeney recommended to USDOE that the appropriate means to identify the best suite of three sites was to conduct a professional portfolio analysis. USDOE chose not to follow Professor Keeney's recommendation. Subsequent to the May 28th decision, Professor Keeney prepared and published such a portfolio analysis. This work was not funded by USDOE. Based on his portfolio analysis, Professor Keeney concluded that if three sites are to be characterized they should be Yucca Mountain, Richton Dome, and Deaf Smith.

Professor Detlof von Winterfeldt was retained by the National Academy of Sciences to assist them in their review of the USDOE ranking methodology. Professor von Winterfeldt is nationally known and respected in the field of decision analysis. Subsequent to the May 28th decisions, Professor von Winterfeldt wrote a letter to Mr. Rusche in which he commented, as an individual, on the USDOE ranking methodology report and on the USDOE recommendation report, in which USDOE described the rationale for its selection of the three sites for further study. Professor von Winterfeldt said that, in his opinion, the analysis in the ranking methodology report is sound, thorough, and state-of-the-art. However, as to the recommendation report, he stated the following:

> *"In brief, I believe that the conclusions drawn in the Recommendation Report are based on selective and misleading use of the analysis described in the Methodology Report. It is extremely hard to find in the Methodology Report any support for the selection of the specific set of three sites recommended for characterization. Instead, I find a convincing analysis that clearly rejects the Hanford site and, furthermore, supports the selection of the Richton Dome site over the Deaf Smith site. The way the Methodology Report was interpreted in the Recommendation Report, in my opinion, comes very close to a misuse of an otherwise excellent analysis."*

In his conclusion, Professor von Winterfeldt stated as follows:

> *". . .The most important conclusion that I draw from the Recommendation Report's inclusion of the Hanford and Deaf Smith sites is that DOE is apparently willing to accept more health effects and an additional cost of $3.360 billion in return for several minor advantages of the two sites. As a decision analyst, I find these implications inconsistent with the Methodology Report. As a concerned member of the public and a taxpayer, I find them irresponsible."*

Neither of these distinguished experts in the field of decision analysis has an ax to grind in this process. They are both from California, and neither was under contract to any of the states involved. They both had been involved in the decision-making process in different roles and when USDOE announced its decision on May 28th, they both felt compelled to go on the public record with their own analysis of the decision.

Subsequent to the May 28th decision, the Washington State Nuclear Waste Board retained the services of ECO Northwest, a consulting firm with expertise in decision analysis, to review the ranking methodology report and the recommendation report. Although ECO Northwest had some suggestions for improvement of the ranking methodology report, their general conclusion was that the analysis in USDOE's ranking methodology report was extremely well done. However, as to USDOE's recommendation report, ECO Northwest said the following:

> *"The recommendations report, in contrast, fails to document either its assumptions or its conclusions. It purports to have conducted analyses of all relevant combinations of the possible sets of sites, taken three at a time, but does not inform the reader as to how this was done; furthermore, it makes several assumptions regarding the importance of the various attributes of the analysis that cannot be supported by the data provided in the multiattribute utility study. Whereas, the* [ranking methodology] *report provides a sound basis on which to begin consideration of the Nuclear Waste Policy Act mandate, the recommendations report is a travesty of nearly everything that decision-aiding methods stand for."*

I hope this brief summary concerning USDOE's application of the ranking methodology helps to make clear why the citizens of the state of Washington are extremely upset about the site selection process. Let me say that this is not a comprehensive discussion of our concerns. We have identified numerous serious technical concerns. Many of these technical concerns are shared by the Nuclear Regulatory Commission. In a recently released report, the NRC staff indicated that many of the technical issues which they raised in their comments on the draft environmental assessments, were not addressed adequately by USDOE in the final environmental assessments.

In a recent election, 83% of the state's voters directed state officials to continue to take all possible steps to halt USDOE's unlawful implementation of the site selection process.

The state of Washington has filed five lawsuits in the 9th Circuit Court of Appeals, challenging USDOE's actions. We believe our lawsuits have an excellent chance of succeeding. But it is senseless to wait for the conclusion of what could be a very long process of litigation before taking action to get the site selection process onto the right track. I am certain that everyone in this room today agrees that an acceptable means must be developed to safely dispose of the nation's high-level nuclear waste.

Isn't it time that we consider a mid-course correction to the repository site selection process? USDOE's May 28th decisions must be retracted and a serious attempt must be made to reach a consensus among the interested parties on improvements to the process. We must develop an approach which provides for a timely solution to the nuclear utilities' short term problem and which establishes a site selection process designed to provide confidence that the search will be for the best site and that selection decisions will be based on credible scientific evidence.

We first need a forum in which we can begin to develop such a consensus. With this in mind I have requested USDOE to take the lead in organizing a non-binding conflict resolution process in which representatives of all of the interested parties would be invited to participate. The process would be conducted not by USDOE but by an independent, nationally known and respected conflict resolution consultant. USDOE would participate in the process on the same basis as the other interested parties.

As a prerequisite to their participation, each participant would acknowledge there is a need for a comprehensive review of the site selection process to consider and discuss changes which would increase the likelihood of success of the repository program. In addition, each participant would make a commitment to channel their energies toward development of an acceptable and workable solution, rather than spending time discussing who is to blame for where we are now.

If USDOE acknowledges that there is a need to consider changes to the site selection process, and enthusiastically supports and participates in consensus-building, their credibility would be enhanced and there is a good possibility that positive results can be achieved. If USDOE is not willing to take these steps, then I recommend that the remaining interested parties explore alternative means of establishing a forum to carry on a consensus-building process without USDOE.

The goal of the Nuclear Waste Policy Act is to site, construct and operate a repository which will contain high-level nuclear waste from the environment for the next 10,000 years. We are seeking to protect the next 400 generations of humans from the potential dangers of waste produced by three generations. If we can agree on an acceptable and workable solution to the nuclear utilities' short term problem, we should not be overly concerned that we have to back up in the repository site selection process in order to instill confidence in its ultimate success.

Thank you very much for this opportunity to give you our perspective on the repository program.

STATE OF WASHINGTON
OFFICE OF THE GOVERNOR

OLYMPIA
98504-0413

BOOTH GARDNER
GOVERNOR

December 30, 1986

John Herrington, Secretary
U.S. Department of Energy
1000 Independence Avenue
Washington, D.C. 20585

Dear Secretary Herrington:

On December 18, Ben Rusche and I met to discuss the U.S. Department of Energy's request that the state of Washington begin negotiations for a Consultation and Cooperation (C&C) Agreement. The purpose of this letter is to respond to your request concerning C&C negotiations and to recommend a course of action which, in my opinion, would substantially increase the likelihood of success for the repository program.

Past actions and continuing litigation have created a situation where C&C negotiations, at this time, are not a reasonable option. I am convinced that negotiations cannot be successful until program credibility is restored, and that USDOE must take the lead in bringing the program back on track.

Enclosed is my proposal for a conflict resolution process which could restore credibility to the program. Rather than wait for the courts to direct that the selection process start over, I recommend a parallel approach which takes advantage of the knowledge and experience of those who have been involved in the process and those interested parties having a stake in the outcome. My proposal could lead to a mid-course correction which would be consistent with the basic premises of the Act. I believe it makes sense to do this now rather than wait until the process is stopped by the courts.

This proposal has been reviewed in depth by the Washington State Nuclear Waste Board and Advisory Council, and they strongly endorse this approach. I ask that you also review and seriously consider my proposal. Please contact Curtis Eschels of my staff or Warren Bishop, Chair of the Nuclear Waste Board, for more detailed information.

Sincerely,

Booth Gardner
Governor

cc: Ben Rusche
Mike Lawrence
Warren Bishop

Legislative Building AS-13 • Olympia, Washington 98504 • (206) 753-6780 • (Scan) 234-6780

NATIONAL CONFLICT RESOLUTION PROCESS: A PROPOSED COURSE OF ACTION

We now have four years of experience implementing the repository site selection process contained in the Nuclear Waste Policy Act. The process is in disarray, subject to numerous well founded lawsuits, and unlikely to progress in the near future. It is time for a mid-course correction, similar to the action recently taken by Congress to put the low-level waste siting process back on the right track. We must take advantage of the knowledge and experience gained by the participants in the site selection process. We need a forum to define the parameters of the mid-course correction. With this in mind, we propose the following course of action:

1. We urge USDOE to take the lead in organizing and funding a national conflict resolution process aimed at developing a proposal for a mid-course correction to the high-level waste repository program.

2. Implementation of the process would be conducted, not by USDOE, but by a skilled, nationally known and respected conflict resolution consultant.

3. Participants in the process would be representatives of interested and affected parties, including:
   a. USDOE
   b. States (not limited to first round)
   c. Tribes
   d. Nuclear Utilities
   e. Environmental Groups
   f. NRC
   g. EPA
   h. Others, if appropriate

4. As a prerequisite to participation, each participant would acknowledge:
   a. A solution must be found to the nation's high-level waste disposal problem.
   b. There is a need for a comprehensive review of the site selection process to consider and discuss changes which would substantially increase the likelihood of the ultimate success of the repository program.

5. As a further prerequisite to participate, each participant would make a commitment:
   a. To channel their energies toward timely development of an acceptable and workable solution.
   b. Not to divert the intended direction of the process by spending time discussing who is to blame for where we are now.

6. Objectives of the process would be to develop the elements of a proposed course of action which would:
   a. Provide for a timely solution to the nuclear utilities' short-term problem.
   b. Establish a site selection process designed to provide confidence that the search will be for the best site, and that selection decisions will be based on credible scientific evidence.

If USDOE acknowledges the need for a consensus-building process and enthusiastically supports and participates in such a process, there is a strong likelihood that positive results can be obtained. It makes good sense to act now rather than wait until the site selection process is brought to a standstill under the weight of litigation and increasing adversary relationships.

STATEMENT OF MAYOR JOHN M. POYNOR
RICHLAND, WASHINGTON
Submitted to the Senate Energy and Natural Resources Committee

February 4, 1987

For more than a year, the potential siting of a nuclear waste repository at Hanford has been the focal point of inquiry and debate. Since the ultimate siting of a nuclear waste repository is a most important issue for the residents of Richland and the Tri-Cities, it is important that the city's position be made known to the members of the Energy and Natural Resources Committee.

In the first instance, we recognize the need to site a nuclear waste repository. That need is critical to the American way of life. It is critical because the cornerstone of our economy is energy, and nuclear energy is an integral part of the economic package. Nuclear reactors, constructed and operated for the purpose of generating power to turn the wheels of industry, are a basic part of the national economy. As a result, the concern of how best to dispose of high level nuclear waste, in a safe and sound manner, is a national concern, not confined to Richland, not confined to the State of Washington, nor to the states of Nevada or Texas. It is a concern that must be resolved on the basis of that which is in the best interest of our nation. We must set aside parochial views and look objectively at selecting sites for disposing of high level nuclear waste, regardless of the states in which the sites are located or the cities that are in geographical proximity to the sites.

If the United States is to maintain its leadership as an industrial and economic focal point of the free world, we must be able to successfully compete in world markets. We can ill afford to curtail a nuclear energy resource by saying, "Nuclear waste isn't my problem, take it somewhere else."

Recognizing the need to locate a safe and sound repository site, there remains yet another issue, equally as important to the citizens of Richland and the Tri-Cities. That issue deals with the health, safety and well being of the residents of our community. Questions relating to the health, safety and well being of our residents, as those questions relate to the potential siting of a high level nuclear waste repository at Hanford, must be investigated, analyzed and resolved, in the greatest detail, so that we, as residents of this community, can determine, based on scientific study, whether the Hanford site is, or is not, a suitable site for such a repository.

In short, the ultimate answer to the question of where to dispose of nuclear waste is an answer that must be based on science and technology. We must guard against clouding the technical issues with rhetoric that is based on emotion. Some of the best scientific and technical minds in the world, many of whom live in Richland and have spent years in the study and handling of nuclear waste, are ready to address these issues. It must be their determinations and conclusions upon which the ultimate decision of where to locate a nuclear waste repository must be made, rather than a decision which flows from some emotional or prejudged ideological position.

In order to determine whether the Hanford site is, or is not, a suitable location, a site characterization study must be completed. That study must address concerns such as health, safety and environment, as well as address concerns such as community impact, transportation, liability and effects on the Columbia River, to name but a few. It is only when a definitive study is completed, that we will have the information necessary to make an informed and enlightened judgement. We firmly believe that site characterization studies must continue and must be completed.

If site characterization studies indicate that Hanford is not a safe and secure site or is not environmentally sound, the City of Richland will be among the first to oppose siting at Hanford. On the other hand, if site characterization studies support the safety and environmental soundness of Hanford, then the city will be among the first to support that location as the site and vehicle for effectively resolving the national concern over high level nuclear waste disposal.

The obvious key is site characterization study. Without such in-depth study we are left only with questions, and no answers.

In November of 1986 a statewide ballot measure known as Referendum 40 was placed before the voters of the State of Washington. That referendum measure, though having no legal significance, was designed to deliver a message to the President, Congress, the Department of Energy and the remaining 49 states. The message, in part, was intended to advise the rest of the nation that the State of Washington was prepared to "use all legal means necessary" to accomplish a series of activities aimed at derailing the site selection process. Further study of the Hanford site, through the characterization process, was one of the activities the State of Washington was seeking to halt.

While many residents of Richland and the Tri-Cities area could agree with at least some parts of Referendum 40, particularly that aspect of the referendum that challenged the Department of Energy's deferred consideration of a second repository site in the east, our city and county strongly opposed attempts to halt the site characterization process at Hanford.

Our feelings concerning the need for site characterization were strong enough to compel a separate ballot issue in Benton County asking the singular question:

> "Should the Hanford site be the subject of further scientific study by the Department of Energy to determine whether it is safe and technically suitable as a high level nuclear waste repository?"

Contrary to the emotional tide that swept the State of Washington with regard to Referendum 40, the voters of Richland and Benton County, people who would be most directly impacted and affected by a potential siting of a high level waste repository at Hanford, voted overwhelmingly in support of continuing scientific study to determine the safety and suitability of Hanford as the site for a high level nuclear waste repository. Based on the certification by the Benton County Auditor, 79% of Benton County voters favored the local ballot issue, while only 21% were opposed to continuing study of Hanford.

Let me clearly state that our community has not taken a position, either for or against, the ultimate question of whether a high level nuclear waste repository should be located at Hanford. That determination must await further study. On the other hand, we have taken a strong position in support of site characterization studies, recognizing that such studies are the only viable means of obtaining objective scientific and technical information necessary to the ultimate decision.

Finally, there exists yet another reason why site characterization must continue to a logical conclusion. With the selection of Hanford as a finalist site, our community has been viewed with skepticism by business and industry that has considered Richland as a site for development. That skepticism stems from questions of health, safety and environmental soundness, coupled with the fear that Hanford may be selected based on political, rather than technical, considerations. That skepticism continues to have a profound economic impact on our community. That skepticism, however, can and will be greatly eliminated as a result of a credible series of site characterization studies that answer, once and for all, the questions surrounding the safety and soundness of Hanford as a potential high level nuclear waste repository site.

On behalf of the City of Richland, I urge you to do everything within your power to assist the Department of Energy in moving ahead expeditiously with site characterization activities.

Thank you for considering my statement on this matter of vital importance to the Richland community, the State of Washington and the United States of America.

John M Poynor

JOHN M. POYNOR
Mayor

The Chairman. Thank you very much, Mr. Eschels. We appreciate your testimony.

Now, from the State of Texas, Mr. Frishman.

STATEMENT OF HON. WILLIAM P. CLEMENTS, JR., GOVERNOR, STATE OF TEXAS AS PRESENTED BY STEVE FRISHMAN, DIRECTOR, NUCLEAR WASTE PROGRAMS, OFFICE OF THE GOVERNOR OF TEXAS

Mr. **Frishman**. Thank you, Mr. Chairman.

My name is Steve Frishman. I am Director of the Texas Nuclear Waste Programs Office. Governor Clements has asked that I convey his regrets for not being able to be here personally, but he has a rather tight legislative agenda right now. He has asked me to present this statement to you for him today, and to be available to respond to any questions that you may have.

Mr. Chairman, as you are aware, the State of Texas has been active and participating since 1977 in the Federal Government's program that seeks to safely dispose of high-level radioactive waste in a manner that is acceptable to the affected public.

The Nuclear Waste Policy Act of 1982 correctly recognizes that the confidence of the public in the waste program is essential to the Nation's successful resolution of the waste disposal problem. We in Texas recognize the need to serve this national purpose of disposing of these dangerous wastes in a safe, acceptable, and timely manner. But regrettably, Governor Clements finds that he must report to you that his confidence in this goal being reached through the current implementation of the Nuclear Waste Policy Act is severely stressed.

Today I will speak for Governor Clements to some of the matters that have resulted in a continued erosion of our confidence in this program.

Governor Clements' view as stated here is supported by comments, reviews, evaluations, and other activities of the Texas Nuclear Waste Programs Office through the years.

On June 16, 1986, testimony was presented on behalf of the State of Texas before the Energy Research and Development Subcommittee of this Committee. In that testimony, concerns were expressed regarding the following topics:

The failure to provide sound and credible technical substantiation for the selection of Texas, Nevada, and Washington as candidate repository sites;

The failure to consult with Texas as an affected State regarding program activities and decisions in a manner intended by Congress and provided for in the Nuclear Waste Policy Act;

The failure of the Deaf Smith County Final Site Environmental Assessment to sufficiently evaluate the potential impacts of salt contamination from program activities on prime farmland and groundwater;

The failure to adequately consider the potential impacts of program activities on essential groundwater resources in and around the Deaf Smith County site; and

The indefinite deferral of the siting of a second high-level nuclear waste repository and the potential adverse health and safety consequences of that decision.

There are additional critical technical concerns that lead us to believe that the Deaf Smith site in Texas is not a suitable candidate repository site, and further to believe that a program that could select such a site for the vast expenditure of funds and time necessary for site characterization must be severely flawed.

The Nuclear Waste Policy Act requires that the Nuclear Regulatory Commission and the Environmental Protection Agency establish technical standards for the licensing of a repository and environmental protection standards to be addressed in that licensing process. The DOE has been told in numerous communications that the Deaf Smith County site has a number of characteristics that raise serious doubts whether it will be suitable for a repository license from the NRC.

Despite the data limitations, which include the fact that DOE has collected no primary data from the designated nine-square-mile site, nor has it drilled any bore holes at the site, the preliminary determination that the site is suitable for a repository development has been announced. We contend that the Act in Section 114(f) requires that this determination be made following the completion of detailed site characterization, not at the time the site is selected for characterization.

I would like to briefly discuss a couple examples of some of the critical technical issues, as you requested, Mr. Chairman.

One of the critical geotechnical issues regarding the potential suitability of the site that raises our concern is whether the host rock characteristics of the Deaf Smith site will permit compliance with the statutory and regulatory licensing requirement that the waste be retrievable for 50 years after initiation of emplacement, as well as whether the repository can be designed as required to preserve for safety purposes this retrieval option.

It is a known fact that salt will creep—i.e., flow under pressure and heat conditions at depth. DOE's own calculations in the final EA recognize a projected high creep rate for the host salt. These same calculations had earlier been used to project creep rates at the geologically similar DOE WIPP project in New Mexico.

When compared to data collected from the actual mine openings, the room closure rate was found to be 300 to 400 percent faster than originally predicted. Also, DOE's predicted closure rates for the Deaf Smith salt were derived from analyses on samples that were selected for the highest purity, even though it is known that the impurities in the Deaf Smith host salt will accelerate creep. This rapid closure rate will preclude maintaining the retrievability option as required by law.

Another major concern that we and the NRC staff reviewers share is in regard to the ability to satisfactorily and safely seal the shafts associated with site characterization and repository development under the geologic conditions at the site. The shafts must transect two major underground aquifers, preclude the possibility of groundwater leakage across the formations and to the host salt horizon, and ultimately avoid creating or serving as pathways for escape of waste from the repository over a period of thousands of years.

A review of available shaft-sealing technology raises serious questions concerning whether these requirements for repository protection and waste isolation can be achieved with any level of assurance. In addition, the ability to seal the shafts adequately directly relates to assuring against catastrophic flooding of the repository, or in situ test facility during construction, testing, and operations.

Mine shaft failures and sudden flooding under geologic conditions very similar to those at Deaf Smith County continue to be reported by the mining industry, and progress is very slow in development and testing of technology that may reduce the likelihood of these types of failures.

This condition is considered adverse to repository safety and performance in DOE's site recommendations guidelines, yet the final EA does not acknowledge the condition as being present. In addition, the associated disqualifying condition in those guidelines regarding the potential for significant risk to the health and safety of personnel during construction, operation, and closure of the facility is given essentially no consideration in the Deaf Smith final environmental assessment.

As illustrated in these examples, the DOE has failed to respond to established standards, as well as its pledge to apply technical conservatism in decisions regarding the potential suitability of sites for a repository. The overall level of criticism associated with a lack of data and the failure to adequately consider available information and interpretation serves only to erode confidence in the technical base of the site-selection program of the DOE.

It is doubtful that a significant investment in additional investigation will satisfactorily reduce the primary uncertainties already identified at the Deaf Smith site. In fact, given the state of knowledge of the site, the greater likelihood is that additional major uncertainties will emerge as investigations progress, all of which will result in further questioning of the ability of the site to safely perform in the required manner.

Similar shortcomings have been identified and described regarding the Nevada and Washington candidate sites, and the pervasive optimism in technical interpretation by the DOE has served to overshadow these, as well as those for the Deaf Smith site.

It is our conclusion that before the program progresses with the needed years of investigation at the selected candidate sites, and the consequent expenditure of billions of dollars, the Congress should direct a rigorous evaluation of the process by which the potential repository sites were selected.

Much has been learned before and since passage of the Nuclear Waste Policy Act that will assist us together in determining whether revision of the initiate site selection standards and initiation of the new technically driven screening of the Nation's geology would result in an improved ability to serve the national goal of timely, safe, and acceptable disposal of radioactive wastes.

Governor Clements believes that you will find this to be the case. Thank you.

[The prepared statement of Gov. Clements follows:]

Statement of
William P. Clements, Jr.
Governor of Texas

Before the
United States Senate
Committee on Energy and Natural Resources

February 4, 1987
Washington, D. C.

Regarding the Status of Implementation of
The Nuclear Waste Policy Act of 1982

The State of Texas has been an active participant, since 1977, in the federal government's program that seeks to safely dispose of highly radioactive wastes in a manner that is acceptable to the affected public. The Nuclear Waste Policy Act of 1982 correctly recognizes that the confidence of the public in the waste program is essential to the nation's successful resolution of the waste disposal problem. We in Texas recognize the need to serve the national purpose of disposing of these dangerous wastes in a safe, acceptable and timely manner, but, regrettably, I must report to you that our confidence in that goal being reached through the current implementation of the Nuclear Waste Policy Act is severely stressed.

Today I will speak to some of the matters that have resulted in a continued erosion of confidence in the program. My statement is supported by comments, reviews and evaluations of the Texas Nuclear Waste Programs Office which has coordinated the State's activities on this issue for a number of years.

On June 16, 1986, testimony was presented on behalf of the State of Texas before the Energy Research and Development Subcommittee of this Committee. In that testimony, concerns were expressed regarding the following topics:

- -- The failure to provide sound and credible technical substantiation for the selection of Texas, Nevada and Washington as candidate repository sites;
- -- The failure to consult with Texas, as an affected state, regarding program activities and decisions in a manner intended by Congress and provided for in the Nuclear Waste Policy Act;
- -- The failure of the Deaf Smith County Final Site Environmental Assessment to sufficiently evaluate the potential impacts of salt contamination from program activities on prime farmland and groundwater;
- -- The failure to adequately consider the potential impacts of the program activities on essential groundwater resources in and around the Deaf Smith County Site;
- -- The indefinite deferral of the siting of a second high-level nuclear waste repository, and the potential adverse health and safety consequences of that decision.

There are additional critical technical concerns that lead us to believe that the Deaf Smith County Site, in Texas, is not a suitable candidate repository site, and further to believe that a program that could select such a site for the vast expenditure of funds and time necessary for site characterization must be severely flawed.

The Nuclear Waste Policy Act requires the Nuclear Regulatory Commission and the Environmental Protection Agency to establish technical standards for the licensing of a repository and environmental protection standards to be applied in that licensing process. The DOE has been told in numerous communications that the Deaf Smith County Site has a number of characteristics that raise serious doubts about whether it will be suitable for a repository license from the NRC. Despite the data limitations, which include the fact that the DOE has collected no primary data from the designated nine square-mile selected site, nor has it drilled any boreholes at the site, the preliminary determination that the site is suitable for repository development has been announced. We contend that the Act (Section 114(f)) requires that this determination be made following the completion of detailed site characterization, not at the time a site is selected for characterization.

One of the critical geotechnical issues regarding the potential suitability of the site that raises our concern is whether the host rock characteristics of the Deaf Smith site will permit compliance with the statutory and regulatory licensing requirement that the waste be retrievable for 50 years after initiation of emplacement, as well as whether the repository can be designed, as required, to preserve, for safety purposes, this retrieval option. It is a known fact that salt will creep, i.e., flow under pressure and heat conditions at depth. DOE's own calculations in the Final EA recognize a projected high creep rate for the host salt. These same calculations had earlier been used to project creep rates at the geologically similar DOE waste Isolation Pilot Project (WIPP) in New Mexico. When compared to data collected from the actual mine openings, the room closure rate was found to be 300 to 400 percent faster than originally predicted. Also, DOE's predicted closure rates for the Deaf Smith salt were derived from analyses on samples that were selected for the highest purity, even though it is known that the impurities in the Deaf Smith host salt will accelerate creep. Core samples from the same boreholes sampled by DOE show multiple interbeds (layers) of mudstone, clay, and anhydrite. This rapid closure rate will preclude maintaining the retrievability option as required by law.

Another major concern that we and the NRC staff reviewers share is in regard to the ability to satisfactorily and safely seal the shafts associated with site characterization and repository development under the geologic conditions at the site. The shafts must transect two major underground aquifers, preclude the possibility of groundwater leakage across formations and to the host salt horizon, and ultimately avoid creating or serving as pathways for escape of waste from the repository over a period of thousands of years. A review of available shaft sealing technology raises serious questions concerning whether these requirements for repository protection and waste isolation can be achieved with any level of assurrance. In addition, the ability to seal the shafts adequately directly relates to assuring against catastrophic flooding of the repository or in situ test facility during construction, testing and operations. Mine shaft failures and sudden flooding under geologic conditions very similar to those at the Deaf Smith

County Site continue to be reported by the mining industry and progress is slow in development and testing of technology that may reduce the liklihood of such failures. This condition is considered adverse to repository safety and performance in DOE's site recommendation guidelines, yet the Final EA does not acknowledge the condition as being present. In addition, the associated Disqualifying Condition (10 CFR 960.5-2-9(d)), regarding the potential for significant risk to the health and safety of personnel during construction, operation, and closure of the facilities is given essentially no consideration in the Deaf Smith County Site EA.

As illustrated in these examples, the DOE has failed to respond to established standards, as well as its pledge to apply technical conservatism in decisions regarding the potential suitability of sites for a repository. The overall level of optimism, associated with a lack of data and the failure to adequately consider available information and interpretations serves only to erode confidence in the technical base of the site selection program of the DOE.

It is doubtful that a significant investment in additional investigation will satisfactorily reduce the primary uncertainties already identified at the Deaf Smith site. In fact, given the state of knowledge of the site, the greater liklihood is that additional major uncertainties will emerge as investigations progress, all of which will result in further questioning of the ability of the site to safely perform in the required manner.

Similar shortcomings have been identified and described regarding the

Nevada and Washington candidate sites, and the pervasive optimism in technical interpretation by the DOE has served to overshadow these as well. It is our conclusion that, before the program progresses with the needed years of investigation at the selected candidate sites, and the consequent expenditure of billions of dollars, the Congress should direct a rigorous re-evaluation of the process by which potential repository sites were selected. Much has been learned before and since passage of the Nuclear Waste Policy Act that will assist us, together, in determining whether revision of the initial site selection standards and initiation of a new, technically driven screening of the nation's geology would result in an improved ability to serve the national goal of timely, safe and acceptable disposal of high-level radioactive wastes. It is my belief that you will find this to be the case.

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The CHAIRMAN. Thank you very much, Mr. Frishman.

All of you have given excellent testimony. Let me say that each of you in one way or the other has suggested that we have some kind of moratorium, determine how better to manage the waste, or choose the sites, or provide for the selection of those sites, and then go forward.

We are very, very sympathetic to what you have said and your complaints, but the passage of the Nuclear Waste Policy Act in 1982 was something of a legislative miracle. It was very difficult at that time to pass. I thought it was dead four or five times, but we put it together—not exactly as I wanted to pass it. Governor Sawyer, I wanted to have the MRS as the primary disposal method. In fact, the Senate, the previous Congress had passed a waste disposal act as an MRS, without going to deep geologic.

But we were persuaded, since the Environment and Public Works Committee also had jurisdiction, and they wanted to go solely toward deep geologic. In any event, a grand compromise was fashioned, and it was the Nuclear Waste Policy Act.

Now from my standpoint, and I think from the standpoint of many Members of this Committee, we are not going to give up that Act and its procedures, flawed though they may be in some respects, without having in place another procedure. So in other words, we have a procedure that can work; that may be somewhat flawed, but we cannot give that up without going to something better. Because it is like a ticking bomb, you have got to do something with it. You cannot just hold it until it blows up. I do not mean to say that nuclear waste is going to blow up. [Laughter.]

The CHAIRMAN. Let us say it is like a rotten grapefruit. [Laughter.]

The CHAIRMAN. Governor Sawyer, there was a very provocative article written in the magazine Science and Technology, which is published quarterly by the National Academy of Sciences, by one Luther J. Carter entitled "Nuclear Imperatives and Public Trust."

In effect, what he does is he examines the Act in the search for sites in some great detail. He says that with respect to the Deaf Smith site, that it is under the acquifer near farmland, much of what you said, Mr. Frishman, and says that in his judgment that is not a good site.

Let me say that I am giving this as his judgment. This is not to be in any way interpreted as my judgment, but it is provocative.

With respect to the Hanford site, he says the total estimated cost at Hanford was $12 billion, with cost uncertainty for this and other sites put at 35 percent either way. Second, to build a repository there might prove impossible at any price. He goes on to talk further about the difficulties at Hanford.

Then he talks about Nevada and says that, while there would be a difficulty or two, that Nevada does not have the absolutely embedded opposition that others would have. Here is what he says, "but the kind of deep, visceral public opposition that has been evidenced in places such as southern Mississippi and west Texas appears to be lacking in Nevada.'

He goes on to say that: With a nuclear test ban treaty, southern Nevada could loose the test site as one of its economic mainstays.

The facility is the State's single largest employer, providing some 6800 jobs.

And his conclusion is that perhaps we should choose one site to characterize, namely Yucca Mountain, but that there ought to be a quid pro quo. This would consist of a quid pro quo with Nevada to acquiesce in the siting activities at Yucca Mountain in return for substantial benefits, perhaps cash bonuses and generous in-lieu-of tax payments, plus assurances that the State would be allowed a strong voice in certain matters of public concern such as the way in which spent fuel will be shipped into Nevada.

I will not go into all the rest of the article, because it is quite detailed, and I will get staff to have a copy for you. I do not ask you to agree with that statement today. For one thing, if one person came here, no matter who he was, a sitting Governor, a former Governor, or whoever he was, and offered up his State, I would think it would be rather foolish for him to do so.

On the other hand, if this article is correct, and I do not know that it is, the Federal Government would save vast sums of money, billions of dollars. It was a great shock to me to learn that the cost of characterization of these sites has grown from what we were told in 1982 about $60 million a site to about $1 billion a site.

If that is so, then maybe the choice—I mean, if he is correct, then maybe the choice that Nevada would make is to go as the present law is going, and not be entitled to much of anything. Indeed, you are having trouble, and I am sorry to hear that, getting the cost of management of the selection process refunded to you by DOE.

Or maybe, on the other hand, there is room for some grand compromise here where Nevada says, all right, if we take Yucca Mountain, we ought to be entitled first of all to determine how that waste is shipped, how it is stored, to have a very dramatic voice in the design of that facility; and maybe people in the county should never have to pay property taxes again; maybe they ought to have grade schools provided by the Federal Government; maybe we ought to have this or that that money can do. And considering that Nevada has already had all these nuclear explosions there, it is not exactly like it is a pristine national park. I do not ask you to agree with that, but I throw that out to you, and I ask you to take that seed back not as my idea, not as something we are trying to force on Nevada, because we have an Act which will proceed, and we may have lawsuits, but the Act, the law of the land, is not going to be easy to change.

But I ask you to take that back so it can be thought about. Staff just passed me a note that says, and maybe site the Super-conducting Super Collider, in Nevada. [Laughter.]

The CHAIRMAN. That is not built yet. You know, that is that $8 billion Super Collider, and I do not know whether we can afford that or not, but we have this funded. This is funded with billions of dollars in the till right now, and ought to be thought about.

Would you like to take that back? Or would you like to speak about it right now?

Mr. SAWYER. Maybe I can just make some comments on it, Mr. Chairman. We are really not complaining about the Act. Our principal concern is what we believe to be a terribly flawed implementation of that Act. We are not asking the Congress to pass a new Act, to abandon the old Act, but to look at the whole problem in terms of implementation and whether or not the intent of Congress is really being carried out.

With respect to the article, I have not read it. I do not know whether this gentleman is a scientist or a journalist. Nevertheless, I agree with him, with the limited knowledge I have, on Hanford and Texas. Frankly, it has always seemed absurd to me that DOE could possibly have picked Hanford, Washington, six miles from the Columbia River, already bothered as I understand it with leakage from the Defense storage that is there into the Columbia River, which affects certainly Senator McClure and the State of Idaho through the Snake River, the States of Washington and Oregon, the lifeblood in many respects of those States.

It always has seemed absurd to me, again having limited scientific knowledge or information, that they would select Deaf Smith County, Texas, below the largest, as I understand, underground acquifer in the United States of America, a river! However, as I understand the guidelines that DOE has set, they had no choice but to select Nevada and Washington because they said one of the three will be tuff. Nevada is the only tuff in the United States. So there was no choice. There was no comparison. There was no selection process. Nevada was it. As I understand it, under the guidelines they said one of the sites will be salt, and Texas——

The CHAIRMAN. Well, let me ask you. I am sure they will speak further about their sites, but what is wrong with Nevada?

Mr. SAWYER. Well, in Nevada we feel that we have just as legitimate objections as the other two.

The CHAIRMAN. Well, you do not have the acquifer.

Mr. SAWYER. We do not have the acquifer.

The CHAIRMAN. Or the farmland.

Mr. SAWYER. We do not have the Columbia River. However, we have a number of other things, all of which are attached to my remarks. We seriously question any studies that they have done with respect to faulting. As you know, Mr. Chairman, weapons testing has been going on for many years, just adjacent to that location.

What that weapons testing, maybe 20, 30 times a year of minor earthquakes, has done to the structure of that tuff, nobody knows. It may very well have weakened it to the point where it simply is not acceptable. We need to test that. We have an underground river going through that area, and I must admit to you that at least when I was in office we did not know how much water was there or how fast it flowed, but we knew it was there, and it services much of the Las Vegas Valley, as Senator Hecht well knows. We do not have any idea, really, how that will be affected.

We have mineral resources in that area, which I do not think anybody denies, which is another complicating problem. So we think that we have legitimate complaints, probably as legitimate as I feel both Hanford and Texas have.

The CHAIRMAN. Let me emphasize, if I may, Governor, it is not our purpose here to choose the site.

Mr. SAWYER. I understand.

The CHAIRMAN. We simply want to air your objections. It would be the Department of Energy—who will choose that site, and believe me I will not try to influence the Department of Energy--unless there was some grand compromise that Nevadans brought up here to us, and we might consider that seriously.

Mr. SAWYER. Well, Mr. Chairman, my response to that is this: That suggestion is not new in Nevada. There are a number of people that feel that we should say, look, we are going to be the site; the whole thing is rigged. It is obvious that Nevada is going to be the selection; let's get out of it what we can. Let's begin to negotiate now, as the Chairman suggests we discuss.

That has been raised both editorially and personally by some of the people on the political scene. I would just suggest to you, Mr. Chairman, and Members of the Committee, that our Governor's reaction to that has been, I do not want to state it for him, but I think he stated publicly that with the present players and based upon his past experience in four years as Governor of Nevada, that under no circumstances would he as Governor accept Nevada as the site.

The general—and Senator Hecht can correct me on this, if I am wrong—but the general public feeling I think about it, even though they understand that we might be in there and get a lot of good stuff out of it, the general public feeling I think is adverse. Some people say as much as 80 percent are adamantly opposed to the site under any conditions.

The legislature three days ago in an Assembly Committee passed a resolution which in effect puts the legislature on record at least to this point of opposing the site under any condition. Whether or not that will pass, Mr. Chairman, I do not know. I am trying to give you a sense of what I think the general public reaction is, because the gentleman that wrote that article in my opinion misstated that, either that or he wrote it quite some time ago before public opinion had jelled.

The CHAIRMAN. The press is frequently wrong.

Mr. SAWYER. I have noticed that, sometimes.

The CHAIRMAN. But it is a provocative article.

Mr. SAWYER. Yes.

The CHAIRMAN. We are not threatening to impose it, or even urging or suggesting it, but simply to point out some salient facts, and also to point out the amount of dollars involved, which are substantial.

I have got some other questions, but let me go——

Mr. LOUX. Mr. Chairman?

The CHAIRMAN. Yes.

Mr. LOUX. If I just might add briefly to your comment, there has been a formal response from the State of Nevada to that article in the form of a letter to the magazine itself pointing out several flaws with the logic that Mr. Carter uses to arrive at his conclusion.

I think in general the State agrees with his discussion of the failure of the program, but then he makes this quantum leap to the Nevada site with I think, again echoing Governor Sawyer's comments, very serious technical concerns as raised even by the NRC staff. The discovery of potential hydrothermal waters beneath the site have caused a great deal of speculation about the ability of canisters to perform in even the 200 to 300 year range, let alone the period of time we are talking about.

Again, the active faulting on the mountain itself, accelerated by weapons shots. I do not think the technical problems at Nevada are any less severe than they are at the other two sites.

The CHAIRMAN. Well, I might add that I do not think there is a place in the United States that is going to be thrilled about taking this. Oak Ridge, with the MRS, the Oak Ridge City fathers wanted it, but they found out later that the State of Tennessee did not want the MRS, and I expect we will find that anywhere. I simply throw that out in case you have not seen the article.

Now we are going to go again on the rule of self-restraint. I would ask the Committee Members to try to hold their questioning down to five or ten minutes. I hope we can go on that rule so we will not have to have time clocks in the future. So let us guide ourselves accordingly.

First I want to recognize the ranking Minority Member, and then we will go on the basis of when Senators arrived.

Senator McClure.

Senator MCCLURE. Well, thank you very much. Let me defer to those who arrived and heard all the testimony. I was detained, and I would like to defer to them at this time, if I can.

The CHAIRMAN. I do not know who was first. I think Senator Hecht was first.

Senator HECHT. Thank you, Mr. Chairman.

Governor Sawyer, you heard what our distinguished Chairman said about our State, how he downgraded it, just another example of what happens with the Democrats in control. [Laughter.]

Senator HECHT. To all of you in the audience, Governor Sawyer is a Nevada Democratic National Committeeman.

I do have one bit of news which was called in to my staff this morning, Governor, that you can take home with you. The Energy Department said this morning they are prepared to make available to Nevada $6.7 million for the 1987 fiscal year. I realize that the State originally asked for $5 million, and more recently requested $10 million for fiscal year 1987. However, we are pleased to be able to tell you that the $6.7 million is now available, and I am prepared to work with you to get the rest of your budget request.

I enjoyed your testimony very, very much, because you dealt with facts. You analyzed the bill which Congress passed in 1982 before I got here, but I have read it. You were very well acquainted with it, and this is the way we have to go in the future. Stick to the facts, because this is your court of last resort.

Next week I am going to be in Nevada and I am going to address the Nevada Legislature, and I am going to say that nuclear waste is an issue that cannot be wished away, and plans to abandon a suitable repository in the East were clearly wrong and, in my view, violated both the Nuclear Waste Policy Act and the intent of Congress.

To go on, nuclear waste is a national problem. It requires a national solution. In order to participate in the selection process, Nevada must maintain a position of responsibility. Otherwise, we lose all credibility, especially with Congress, the court of last resort.

The bottom line has to be safety, whether it is ours or our neighbors'. We cannot put politics above the safety of the American people. You brought that out today, because you have brought out the Department of Energy's site selection process. There was too much politics involved. This is too important an issue to be dealt with in politics, and that is why we must base our positions on facts and scientific knowledge.

In your testimony on page 11, you made a very, very good point which we have all been looking at for two or three years. It is clear, I believe, that as a part of this process Congress must revisit several fundamental questions. For example: Is deep geologic disposal really the safest and best solution to the waste disposal problem?

Then you go on to say, no other nation appears to regard it as such. We had the Swedisn nuclear group in with us last week, or the week before. I think we are going to have a trip to France, and Germany with our distinguished Chairman, seeing how France deals with it, and in my opinion France has done so well with nuclear plants. I do not know what the statistics are, but I think by the year 2000 they are going to be somewhere between 80 and 90 percent nuclear. They are making plans for the future, and I continue to bring up to our Chairman that we are not making plans in America for the future as far as energy is concerned, whether it is nuclear or the fact that—we are not going out and getting enough oil. Other countries are going ahead on this.

You also brought out something I have been talking about, too, the effect of nuclear detonations. I am going to be appointing a blue ribbon panel of the best scientists available in the next few months to conduct an independent study of any possible correlation between the earthquake fault that runs through Yucca Mountain and the man-made earthquakes generated at the nearby Nevada Test Site.

During Energy Committee hearings last year I was shocked to learn that according to DOE no earthquake study had ever been conducted. Nuclear waste opposition based on scientific fact will ultimately bear much more weight in the final decision than hysterical and political rhetoric.

I hope this report will be ready within the next two years. Also, once I got into this I found out that we have a live volcano approximately 100 miles away from Yucca Mountain. This has not been addressed. So, together let us address this whole situation, the nuclear situation, on facts and not hysteria. Then when you come to the Committee like you did this morning, you have an audience, and you have an audience outside of this forum in the United States Congress.

I thank you for making the long journey. I enjoyed your testimony.

Mr. SAWYER. Senator Hecht, in order to clarify any political implications from your remarks, let me say that indeed I am National Committeeman. However, Senator Hecht and I have been personal friends for a good many years, and have the highest regard and respect for one another.

Senator Hecht, I am aware of the activities that you are taking with respect to the faulting and the testing activity there and greatly appreciate, as does everyone in Nevada, your insistence that this potential be scientifically evaluated. We are delighted—from Nevada, we are delighted you are on this Committee.

Senator HECHT. Thank you.

Thank you very much, Mr. Chairman.

The CHAIRMAN. Senator Hecht is a very valuable member of this Committee. As a matter of fact, I agreed to expand the Committee so he could come on. So we are delighted to have him.

Senator HECHT. And I thank you again for that kind consideration. You know, Nevada has roughly 87 percent of our land controlled by the Federal Government, so certainly it is important for a representative from Nevada to be on this Committee, and I thank you again publicly, Mr. Chairman.

The CHAIRMAN. We have another Member of this Committee who has a slight interest in this issue.

Senator Evans.

Senator EVANS. Thank you, Mr. Chairman.

Let me say to my colleague from Nevada, you may have 87 percent public land, but you sure use the other 13 percent pretty effectively. [Laughter.]

Senator EVANS. I should say that if you have a live volcano somewhere within 100 miles, we will match you live volcanos within 100 miles of the site. [Laughter.]

Senator EVANS. We have got our own in St. Helens.

It is a delight to welcome this panel, and particularly my old colleague Grant Sawyer who served as Governor of Nevada while I served as Governor of Washington.

Let me ask the question of each of you. As a basis for where we ought to go, this is really an oversight hearing on the Act, where we have come, and where we should go. Let me begin with the question: If—and I emphasize the "if"—if an appropriate scientific investigation were concluded that came out with a recommendation that, yes, a deep geologic storage was safe, yes, that the Government could legitimately sign off on an environmental impact statement that would make it safe for the 10,000 year period they suggested, that it met all of the questions that arose, and the site happened to be in your State, at that point is it a legitimate thing for you to accept the site?

[Pause.]

Senator EVANS. Well, I am overwhelmed by the silence. How about Texas?

Mr. FRISHMAN. Senator, this is not a new question.

Senator EVANS. But it is a pretty basic one. If we cannot get past that question, we cannot get to question number two.

Mr. FRISHMAN. Our position has been, I think throughout the State's about 10-year involvement in this process now, that if the scientific information were compelling, if we were satisfied that all investigation had been rigorously exhausted and led to a site in Texas being the best site that could be identified in the Nation, then, yes, we would have to seriously consider our position regarding whether we would find that acceptable or not.

I think you are well aware of the provisions in the Act that sort of politically drive some answers that may not be exactly reflective of what I just said, but we have all along said if in fact we have the site, regardless of whether it is Deaf Smith or not, and we do not believe Deaf Smith to be the one, but if we had a site where it was compelling and convincing that this was the safest site that could be identified in the Nation, we would have to look very seriously at that as we serve the Nation.

Senator EVANS. I am not sure if that was a yes, or a no, but it is probably as close to yes as anybody can come.

The CHAIRMAN. They would look very seriously right before they exercised the veto. [Laughter.]

Mr. FRISHMAN. Well, that was the provision I was referring to. The veto provision is politically a very difficult one both for governors and legislatures, and for the Congress.

Senator EVANS. Sure, and I understand that fully. I understand all of the political connotations that are contained in the question.

Mr. Sawyer, how about you?

Mr. SAWYER. I have anticipated this question, too. My feeling is that with the present situation that the Department of Energy will probably never be able to re-establish its credibility to the point where Nevadans would say we believe what they have found.

Senator EVANS. I understand that, and I may well agree with that, but that really was not the question. The question was: What in your view should the answer be, assuming the—with the big "if" at the front end—but the overwhelming and compelling scientific evidence was that a repository indeed could be sited in a particular location safely for this period of 10,000 years, and that site happened to be in Nevada.

Mr. SAWYER. If that conclusion came from an agency that had credibility, that had established itself as authoritative and could be believed——

Senator EVANS. I will stipulate all that.

Mr. SAWYER. Then of course anybody would have to take a look at that. [Laughter.]

The present situation does not permit that, because the players presently have no such credibility. And even if they arrived at that conclusion, I do not think anyone would believe it.

Senator EVANS. I understand that.

Mr. Eschels?

Mr. ESCHELS. The short answer to your question as it was posed is, yes, we would do that—remembering the conditions. That has been our position, and continues to be our position.

Senator EVANS. It seems to me that that has got to be, for the Nation, the only appropriate answer. We already have the waste and it is not going to go away. At least we have not yet discovered a way to make it go away. We may, in some future time, but it is going to be here. We have got to handle it, and we have got to dispose of it in the safest and best way we can.

At the point we get to that recognition, somebody, somewhere has got to be prepared to accept it.

Let me turn from that to more troubling parts of this dilemma. The public law that we are dealing with has a significant requirement in section 117 on consultation with States and affected Indian Tribes. So we can be prepared, I will ask some of the same questions of our representatives of the Indian Tribes and Nations that will soon testify.

Let me just read a couple of sentences from it and ask you if the Department has in fact responded adequately to these provisions in law. It says at the very beginning:

> The Secretary, the Commission, and other agencies involved in the construction, operation, or regulation of any aspect of a repository in a State shall provide to the Governor and Legislature of such State and to the governing body of any affected Indian Tribe, timely and complete information regarding determinations or plans made with respect to the site characterization, siting, development, design, licensing, construction, operation, regulation, or decommissioning of such repository.

And number (2):

> Upon written request for such information by the Governor or Legislature of such State, or the governing body of any affected Indian Tribe as the case may be, the Secretary shall provide a written response to such request within 30 days.

To what degree has that provision of the Act been followed? Let's start with Mr. Eschels.

Mr. ESCHELS. Between those two parts, our strong preference is to rely on the first; to have a good interchange of information. To answer your question, let me give you a specific example.

Beginning as long ago as last May before the decision, we, our staff, asked the Department of Energy for more specific information about just what activities were going to be—what activities were planned in Washington State for the remainder of 1986. Recall, now, we first asked that in May.

We had to ask again. We asked more formally. In July, we understand, the information had been developed by the regional office of the Department of Energy and forwarded to headquarters. Nevertheless, after repeated attempts we did have to resort to the 30-day letter. We did send one from Governor Gardner's office to the Department of Energy, and it took 29 days to get the response.

Senator EVANS. How long?

Mr. ESCHELS. Twenty-nine days.

Senator EVANS. To get a response. What was the nature of the response?

Mr. ESCHELS. It was a long list of things that said, well, we already told you that; and, see the appendix. However, if you turned to the appendix, where we had asked for specific information it was just—principally, it was generic information. It was not helpful for the kind of determination that we needed. It was not specific.

It had taken, as I said, eight months to get what should have been provided early on.

Senator EVANS. How about Nevada, or Texas, either one?

Mr. LOUX. Senator, in Nevada's case I think we would concur with the remarks of Mr. Eschels. We in fact have requests for data in from 1984 which have yet not been fulfilled. We have correspondence and other requests which are some six, eight, nine months old which have not been acknowledged or responded to. We, too, have also invoked the 30-day Governor writing to the Secretary provision in the Act, and on occasion it has gone as long as 45 to nearly 60 days before we have gotten a response to a letter from the Governor to the Secretary.

I guess lastly is our situation with funding. We historically have had not the ability to get the adequate amount of funds we think are necessary to conduct our program. The Department of Energy always would like to give us some money now, and defer review of the other aspects of our grant requests to sometime out in the future, and it appears, given the announcement that we just heard, that that in fact is still the case with the Department of Energy being willing to give us a portion of our grant request and deferring the rest.

But in answer directly to your question, we do not think the Department of Energy has lived up to any of those provisions in the Act.

Senator EVANS. Tell me again the nature of your request. How much money were you seeking?

Mr. LOUX. $10.2 million for fiscal year 1987.

Senator EVANS. Just for the record we should note that the request this year of the Department for Nuclear Waste Fund activities was something like, what, $780 million, close to $800 million, and the Department could not afford $10 million.

Texas?

Mr. FRISHMAN. We, too, have had difficulties similar to those you just had related to you. I think it is important to recognize that the Act speaks to two real issues. One is timeliness. The other one is completeness.

Senator EVANS. Exactly.

Mr. FRISHMAN. Timeliness is very difficult almost all the time, and the provisions in the Act regarding timely information can be satisfied relatively simply if the Department does not care to provide immediate and direct information. It can tell us when we will be provided that information, and it is very rare that it is able to do that even within 30 days.

We have had a number of times when we have raised issues where, due to the failure of the Department to respond to our questions, circumstances and departmental decisions have outrun the vitality of the questions themselves. So we get a blank for an answer, and we ultimately hear what the Department's determination is.

In the area of completeness, let me just give you one example that is of particular concern to us right now. That is, that the Department, even in Chapter 4 of the Final Environmental Assessment, has not provided sufficient information regarding its actual plans for site characterization for us to be able to fully determine who the affected private landowners are that the Department now tells us they want to communicate with next months in terms of trying to acquire land for activity.

We do not know, through an official Department of Energy document, exactly what land they need to acquire, at what time, for what purposes in Deaf Smith County. We have continually asked. It is to some extent not a matter of they will not tell us. To some extent it is a matter of they do not know, either.

But the part that they do know and that they are telling us is sort of the basis of what we should understand, is a draft contract of the document that they sometimes accept, sometimes disavow, depending on particular instances, but this is what the affected landowners are going to have to deal with. I do not believe this fits the statutory requirement for completeness of information.

Senator EVANS. Would each of you, for the record, submit a chronology of times when you felt that information as required under section 117 was not provided in a timely fashion, or in an incomplete fashion, or where there was a response required from the Department within a 30-day period where that response either did not come within the 30-day period, or if it came it was patently or grossly unresponsive?

[The information requested appears in the appendix.]

Senator EVANS. Let me ask one other round of questions of each of you, again on the operation of the Act itself. Section (c) of section 117(c) requires the initiation toward written agreements, stating in part that "The Secretary shall seek to enter into a binding written agreement and shall begin negotiations with each State and, where appropriate, to enter into a separate binding agreement with the governing body of any affected Indian Tribe" and then it sets forth the various elements. These are the consultation and cooperation agreements.

It is my understanding that at this point, four years after the Act's passage, that DOE's intent is to begin these discussions not later than 60 days after either the approval of a site for site characterization, or the written request of the State or Indian Tribe to the Secretary, whichever occurs first.

Could you tell me a little bit of what has happened? Whether the State, in any case, has opted to request a written agreement, and at what time? Or whether there has been any movement toward a successful response to this provision of the Act? If each of you could just briefly do it, and then I would ask in the same fashion if you could set forth for the record a chronology of just what has been each state's experience for this section.

[The information requested appears in the appendix.]

Mr. ESCHELS. Attached to my formal remarks are copies of the letter from Governor Gardner to Secretary Herrington, which is his formal response to the request from the Department to resume the C & C negotiation. I say "resume," because the State of Washington among the States is the only one that had begun negotiations back in 1983, I believe.

At that time, we were unable to resolve very difficult questions having to do with nuclear waste liability, transportation, and several others. For that reason, negotiations were not resumed I believe in 1984. Subsequent to the May 28th decision, we did receive a letter, as did the other States, identically worded from the regional offices. It was a form letter on the last day, again the 59th or 60th day that was required, and it asked for something that is not exactly what is under the Act.

It said, we the Department are inviting all of you to sit down together for joint negotiations with us. And our reply was, no, we are not interested in that.

Senator EVANS. Let me interrupt there and ask, in your view was it necessary in the development of that letter, was the letter technical enough or in any way detailed enough to require 60 days to develop?

Mr. ESCHELS. No.

Senator EVANS. How long would you guess it would take to develop the letter of the nature you received?

Mr. LOUX. About a half an hour, Mr. Chairman.

Mr. ESCHELS. Yes, the drafting itself, perhaps a half an hour; they will run it up and down the chain for a week.

Senator EVANS. But they waited until the last day to send it?

Mr. ESCHELS. Yes.

Senator EVANS. Thank you.

Mr. SAWYER. Mr. Loux will answer for Nevada. Excuse me, Mr. Chairman.

Senator EVANS. Well, I think Mr. Eschels——

Mr. ESCHELS. Yes, I did want to finish up with that.

The point was, I think they were asking for something that would not have been helpful toward resolving the problem. They asked again, I believe in November or December, the answer to which is appended to the testimony.

What we are saying I think is the same thing that several of the Appropriations Committees said in the Committee Report accompanying the appropriations. I do not have the exact language in front of me, but it says the Department of Energy should seek consensus among all of the interested parties, especially the States.

If anything, we are headed in the opposite direction from that. That is why the Governor makes the suggestion toward conflict resolution. We think that fits the spirit of the Committee Report, and in fact the spirit of the Nuclear Waste Policy Act. We are not headed in that direction.

Senator EVANS. When did you submit that proposal for conflict resolution to them, or when were they first made aware of that?

Mr. ESCHELS. Ben Rusche visited Washington State and spoke with the Governor on December 18, 1986. At that point, we gave him a copy of what was then a draft suggestion. It was transmitted formally December 30, 1986.

Senator EVANS. It seems to me that this proposal represented a remarkable effort, under the current circumstances which exist and the shot and shell in our state that is being fired in all directions, lower the volume of conflict and really reach out toward something constructive.

Have you received any kind of response from the Department of Energy yet on that proposal?

Mr. ESCHELS. No.

Senator EVANS. Thank you.

Mr. Sawyer?

Mr. SAWYER. Senator, Mr. Loux who has the day to day dealings will answer you.

Mr. LOUX. Senator, in terms of chronology, I think we reported the same events taking place. The first notice we have gotten of any interest in a written agreement, at least on behalf of the Department of Energy, was the late July letter which Mr. Eschels mentioned that came on the 59th or 60th day; and additionally, a letter from the Secretary to the Governor—excuse me, from Mr. Rusche to the Governor in late November.

The Governor responded at that point indicating that certain elements of the program he felt were flawed, and in fact illegal, and it was unconscionable in his estimation to enter into negotiations on the balance of the program with these other issues hanging which we believe are illegal at this point, including the siting guidelines, the environmental assessments, the preliminary determination, of course the issue that you are most familiar with at this point the second-round decision. As, importantly, the Governor indicated to the degree that those issues are negotiable with the Department of Energy, that we would be willing to sit down and discuss those issues; but to the degree that they are not, then we are not. But if they get resolved by the courts, by Congress, or by the Department of Energy, then in fact we may be in a position to sit down and discuss negotiations.

In addition, the Governor cited the continual and ongoing process with our grants, which we have talked about to some degree already, indicating that that continual process of withholding money, taking in this instance over four-and-a-half months to evaluate our grant with no correspondence in the interim, makes that process even more difficult.

So at this point, he has declined to negotiate primarily based on those reasons I have cited.

Senator EVANS. Mr. Frishman?

Mr. FRISHMAN. We in Texas have the same set of letters, the July 25 letter, and then the November 20 letter. In our responses to the Secretary's report that was sent to us, according to the Act, for review, we noted a number of items. Eventually I think that will be submitted, if it has not already. It is already outside the 30-day period for submission.

We noted, among other things, that we received that only five days before the end of 30 days. So that there was no way we could have responded and the Secretary reported within the statutory 30 days.

Some other points that we did note was that the report itself that Mr. Loux referred to as taking maybe a half an hour to draft, and I agree with him, the notable thing that the report did not do was the one thing that the Act really requires that it do. That is, provide the reasons why a consultation and cooperation agreement had not been completed.

The Act allows the affected parties to be in a position of not requesting to initiate. In that instance, then the Secretary has a duty to initiate. I think you will see in our responses that the Secretary through his July, or through Ben Rusche's July 25 letter, and again through the November 20 letter, did not carry out the duty as required in the Act in any way that could have led to completion of an agreement, even if all other considerations would have allowed such an agreement to be completed.

So the duty itself was not carried out in a way that we could have responded to, if there were even a possibility of arriving at a completed agreement. Our view of an agreement at this point is I think similar to others in effect, but maybe not for the same reasons.

We at this point have been informed as of November 20, just 8 days before the close of our 180 days, who the lead negotiator for the Department of Energy would be if we were going to negotiate I guess in those last 8 days. We acknowledged that, and said, talk to us. Well, that has not been initiated formally. We are of the view that it would probably not be fruitful at this time to begin formal negotiations for a consultation and cooperation agreement, primarily because we do not know enough about the Department's proposed program in Deaf Smith County for us to even be able to scope what all the topics might be.

At this point, we have agreed that we will defer formal negotiations, although we recognize that some circumstances are likely to arise very soon that will require some kind of formal agreements on rather narrowly bounded topics. We will be looking at those, trying to arrive at some formal agreements, and if you and the Department of Energy want to call that C & C, well, provided they are reported correctly, we may not contest what you call them; we see an agreement as being necessary, regardless of how C & C agreement is defined in the Act, but on very narrow, topical issues as they reflect and drive the DOE's activities within the States.

Senator EVANS. Thank you, Mr. Chairman. You have been most generous with time, during this series of extraordinarily important set of oversight hearings. We need to find out as well as we can not only how well the Act has been carried out, but address this specific question in the current appropriation act which says that $79 million will be released only upon certification by the Secretary of Energy that he has made a good-faith effort to comply with precisely the section I have just asked about.

It will be interesting to see whether he will have the bravery to submit that kind of a request to Congress. Let me say one other thing, Mr. Chairman, that relates but is not directly associated with this set of oversight hearings.

I, for one, at this point do not intend—or at least intend to use all the strength I have to prevent—any more money, the $79 million, which incidentally is ratepayer's money, not our tax money, to be given to the commercial high-level civilian waste when the Department has done such a miserable job, has ignored the needs and the fundamental responsibilities to handle the high-level defense wastes on the Hanford reservation. There have been complaints going way back to the early days of my own administration as Governor, and for which there are yet no real efforts of any consequence to handle that with the technology we have today.

We had better learn how to clean up the existing defense wastes before we start talking about long-term disposal of civilian waste.

The CHAIRMAN. Well, we know how to clean it up. They just have not.

Senator EVANS. That is right.

The CHAIRMAN. The problem of dealing with it is not really a formidable scientific problem. That is the incredible thing about nuclear waste. As a scientific challenge, it is way behind chemical waste in terms of difficulty, in terms of danger, but not in terms of politics.

Senator McClure.

Senator MCCLURE. Mr. Chairman, thank you very much.

I want to thank you for scheduling these hearings, and I want to thank the witnesses for being here. I am not at all certain that I envy you your task in the States that have been identified as potential sites to respond to the political pressures that are very real.

The Chairman made some references to that, and I think this Committee, in formulating the Act under which we are attempting to structure a national policy to get some repositories built, recognized that if a State can exercise a veto, the political forces are going to force it to exercise the veto.

I think the reactions in the three candidate States already indicated ~~to us~~ that it is easy to fan the flames of emotion that create the political heat that make it impossible for you to respond in much different fashion than you already have.

My feeling was, and up until today has largely been, that that is what we are seeing in each of the States, is the political reactions that says we do not want it, and we cannot politically say we do want it or can accept it, and therefore we are going to do everything we can to obstruct the process.

I am convinced, however, from your statements and from the statements you have made before that there is something more than just that. I give you, first of all, the caution that I think many of us recognize, you are in a bind where you have to object and you are going to, and you are going to erect the best arguments you can, and we are going to try to sort out of your testimony those things which are beyond that, legitimate concerns about the process as distinguished from the necessary political reaction expressed in your States that, gee, we do not want it here, and we are going to try to find the reasons why we should not have it here.

Having said that, each one of you has in your own way, and in many respects in the same way, said that the process is not working. You do not have any faith in the process; that the Department has lost credibility. How many steps backward would we have to go? How far back towards square one would we have to return in order to regain the credibility that you say is so badly lacking today?

Mr. Eschels?

Mr. Eschels. It is a very frustrating experience working with the Department, and I think I am sensing a lot of frustration among the authors of the Act and you who oversee the Department.

The difficulty we have I think includes the political situation, but it also goes ahead of that to look at the technical bases for the selection of these particular sites for characterization.

Senator McClure. Are you telling me then we ought to go clear back, ignore the selection of these sites for characterization, and start over from square one?

Mr. Eschels. No, not square one. What we are——

Senator McClure. One-and-a-half?

Mr. Eschels. What we are suggesting is what we call a mid-course correction. Stay with the fundamentals of the Nuclear Waste Policy Act. It was well crafted. It was well thought out, and it was balanced so that it would work—could work, excuse me. However, the implementation has been such that the Department—let me digress for one example.

They put together this big ranking methodology. They brought in the National Academy of Sciences, one of the world's best Decision '80 methodologists, and put together as I say a state of the art ranking methodology. Add to that, as a separate item, they said, well, we have got to have rock diversity, several kinds of different rock. Okay, fine.

Senator McClure. That was required in the Act.

Mr. ESCHELS. Okay, and that was probably wise. So one of the things they said was, we want to have one basalt site on our list of finalists, and we want to have one tuff site on our list of finalists. Great. The problem is, they only put one in at the top, one basalt site. I do not care how fine your screening mechanism is, if you do not require that it comes out, it comes out.

What they ignored in the meantime is, to give you an example, DOE has a model that looks at groundwater travel time to predict how long it takes. They applied that at Hanford and it took 22,000 years from the repository site to get out. In the Mississippi site it took 35 million years. We think that is a significant difference. The Department does not think that is a significant difference: 22,000/35,000,000.

That is an example of why we do not have any confidence in the technical bases.

Senator MCCLURE. So you would go back before the site selection and start all over again with a nationwide site selection?

Mr. ESCHELS. Before the site selection process. Put it on a technical basis, and continue with the foundation of the Act.

Senator MCCLURE. In other words, pick up right after the passage of the Act, and scrap everything that has been done since then and go back and start the process all over again. Now that may not be square one, but it is so close to it I can scarcely see the difference.

Mr. Sawyer?

Mr. SAWYER. Senator, I would agree generally with that statement. The first real major flaw in the program, we believe, was in the siting guidelines. The siting guidelines selected Nevada and Washington. They said, you need one basalt site, you need one tuff site, we are the only ones.

So there was no comparison there. We think that was the first major defect, and we think it should go back to that point and try to find the best site, not——

Senator MCCLURE. You could not accept a process that took that as a given, and built on that?

Mr. SAWYER. You mean that siting guideline?

Senator MCCLURE. Yes.

Mr. SAWYER. No, because it is a preselection, we believe, and I do not think it should be that way. I think we want to find the best site.

Mr. FRISHMAN. I agree that is the position to begin, and I really disagree with your implication that we have been wasting our time and money right now. I think we right now, collectively, those of us who have been involved in this very rigorously full time, I for one full time for over five years now, I think we have the capability to go back and take what we know and write some technical site selection guidelines as in 112(a) or as 112(a) expected, and write them in a way that in fact are designed to screen the Nation's geology for excellence as opposed to the way they are currently written, which is to protect sites that the Department of Energy already thought and were committed to; also, that will be very sensitive to the types of socioeconomic and environmental concerns that we have become much more knowledgeable in over these last five years, and particularly are sensitive to the types of things that we have learned are probably necessary to house a repository.

We have learned a lot. We are not throwing everything away if we go back, develop very rigorous standards, screen the entire Nation, and try to get back to where we are right now. I have I think in similar questioning over the last two years with this and other committees, I have estimated it would take approximately five years to go through that process.

Ben Rusche I believe at this table not too long ago was asked a similar question and gave approximately five years. Also, if you look at the expenditure of the program under the Act so far, we are probably in the realm of about $900 million right now, maybe a little bit less than that. A lot of work has been done, and a lot of funds dedicated to work other than the site selection process.

So if you started carving down how much money has a potential to have been wasted, if we go back and really started at square one, not forgetting what we know about these sites, but putting them in a realistic screening method, it could be a few hundred million might be subject to waste, but at the same time we have learned a lot out of those other than just saying these are the three sites.

Senator McCLURE. But in terms of the process, you would go back to that point which is the beginning of the process?

Mr. FRISHMAN. Correct.

Senator McCLURE. Even though we may have learned something to make it work better, that is where you would go back to start?

Mr. FRISHMAN. Correct.

Senator McCLURE. I would point out of course that if I were from a State that had already been selected, that is where I would want to start, too, so that the 47 other States got back in the mess.

Mr. FRISHMAN. Well, may I suggest that——

Senator McCLURE. And then you would have a chance to get out. I do not say that unkindly. I think I understand the political implications and the political difficulty, and you may even be right. But I am not certain that you are right.

At the hearing before our Committee in September of 1985, that is right after the first Mission Plan was adopted, many of you expressed concern that the compressed schedules listed in the Mission Plan had caused you to lose confidence in the program. Now the revised Mission Plan has extended those timetables. Has that caused you to get any more confidence in the schedule, or in the program?

Mr. ESCHELS. Senator McClure, if we believed that we were making progress, that might be true. I think what we are doing is simply stretching out the fight. We are building an entire repository program to dispose of national waste on a foundation that will not support it.

Senator McCLURE. So even though there is greater time, it does not give you more confidence in the program?

Mr. ESCHELS. That is right. Look at the consequences, if you will. This process is headed toward the cliff. It is going to go over. We will have wasted all of the money that we have put into it so far, and we will have wasted perhaps another billion dollars or so more while the courts—until the courts send it back.

Rather, we are proposing that we go back only part of the way. Furthermore, do not just go back and stop; go back and put it back together so we do not have a shambles. Bring in all the parties in interest, those who can trip up the process down the road so that you have got concensus. That, as far as I know, is the only thing on the table which is other than this kind of confrontation which will not lead us to a repository.

Senator McClure. Governor Sawyer?

Mr. Sawyer. I will let Mr. Loux handle this.

Mr. Loux. Senator, I think that we view the schedule slippage with the same degree of skepticism Washington does. Getting back just a little bit to your previous question, under the siting guidelines, should they have been developed on a sound, technical basis utilizing the criteria that you carefully laid out in the Act citing that geology should be primary, I do not believe that any one of these three sites would be sitting here at the table today. I do not think they are qualified.

But beyond that, schedule delay in my estimation, more time and more money thrown at these sites, is not going to make them look better. I think in fact we are just going to discover further technical defects in the sites as we go along. Schedule slippage certainly does not give me greater confidence in the process.

Senator McClure. Mr. Frishman?

Mr. Frishman. We are in essentially the same position. I think you will note a comment similar to what you just heard within Governor Clements' testimony.

We are interested to see that the Department finally recognizes that it just physically cannot accomplish what is necessary even at minimums if they stuck to the schedule of the Act any longer.

We still are in the position that, first of all, the program has suffered tremendously because of the dogged adherence to that date for so long, and the determinations that were made of what would be sacrificed in order to meet that schedule.

Now there is sudden relaxation. The promises are that the world is going to get so much better; but, just as you have heard, given the problems with the sites, more time, more money does not make an unacceptable site an acceptable site for licensing.

Senator McClure. Just one final comment, and then I will yield, but I have some other questions which I may submit for the record.

Mr. Eschels, your comment about one parameter reminds me of one thing. That was, you were talking about the difference between 22,000 years and 35,000,000 years, and whether or not there is a great difference. Obviously there is great mathematical or numerical difference between those two figures, but is it a significant one?

If I recall correctly, the Colorado River Basin has within it a lot of natural uranium deposits. I think there are some in the Columbia Basin, as well. I know there are some in the Columbia Basin, both thorium and other rare earths in particular. After 600 years in a repository, these wastes will be at the same level of radioactivity as the natural uranium deposits that occur in much of the Colorado Basin—600 years, not 22,000 or 35,000,000.

We do not have any man-made structures that are that old in this country, but there are structures that old in Europe, in the Middle East, in China, and the Far East, structures that have been around for many times longer than 600 years with structural integrity.

I do not think it is beyond the realm of reason to believe that we can give reasonable assurances to the American public that we can build structures with structural integrity for the next 1000 years, let alone 22,000 or 35,000,000; but maybe, indeed, we are over-reacting to the long-term problem that may not exist.

Maybe what we ought to do is just go out in the middle of one of the uranium ore bodies and plunk the stuff down there, and 600 years from now you will not be able to distinguish it from the rest of the stuff.

I do not know. I just simply put it out there simply because it seems to me when we start talking about these long timeframes, we are talking about things that really do not have the relevance that many people attach to them. That is not a scientific statement, I know, although it is based upon statements made to me by scientists.

Somehow, we have got to get this back into a reasonable context of what the alternatives are. I do not blame you for wanting some other State to be looked at. Maybe you are right. Maybe you are right, but at some time this Nation has to make a decision, and at some time we have got to make a decision that we stick to and that is credible.

Now if I just look at the NEPA process on site characterization criteria, you tell me how you are going to be able to go into court, if you were DOE, and say we have looked at every other alternative in the United States, every other one, without exception? You do not have enough scientists and enough manpower and enough money to do that to the satisfaction of some of the courts, no matter how much time or money we spend.

Now maybe we have to take another look, and we are doing that, and I think it is justified, but there has to be some reasonable limits on this program. There has to be some reasonable trust. Maybe the Department has not justified it or acted in such a way as to encourage it, but maybe too we see an action on the part of some who just say I do not like it, I do not want it, it is not going to happen.

I suspect we have got at least a fair measure of that, not from these witnesses here, because I think you are all doing your very level best to tell us what you need; but what the Nation needs is a decision sometime in a predictable timeframe.

Thank you, Mr. Chairman.

The CHAIRMAN. Thank you, Senator McClure.

We are glad to welcome Senator Brock Adams here from the State of Washington, who is not a Member of this Committee, but he has got a vital interest in this subject and we have invited him to participate.

Senator Adams.

Senator ADAMS. Thank you, Mr. Chairman. I appreciate the Chairman inviting me, and I particularly appreciate having the opportunity to question. I will be very brief, because most of the questions have been covered.

But I would like to follow through on the Chairman's direction of what specifically in this first site selection process is wrong, and what the Committee, the Senate, and the Congress might be able to do to correct it.

With that, Mr. Eschels, I would like to ask you first three questions on these C & C agreements, because apparently they are not moving under the Act, and I am concerned that they are not going to move at all. Then I want to move to your proposed solution, and then join with my colleague from the State of Washington in determining whether or not more money should be put into a process that is not moving.

My three questions are:

First, did you ever have a proposal in the stage where it was prepared to be signed for a transport system that would support these repository sites?

Let us start first with you, Mr. Eschels, and then Governor if you wish to comment, and then the witness from the State of Texas.

Mr. ESCHELS. No, we did not.

Senator ADAMS. You did not. You have never had a way of getting it in and out of the repository site as any type of agreement similar to, for example, what has been done in South Carolina?

Mr. ESCHELS. No. We have been working with not only the Office of Civilian Radioactive Waste Management, but also the Office of Defense Programs in the Department of Energy, but we do not have that either as part of the C & C process or separate from it.

Senator ADAMS. Second, did you ever arrive at either a resolution or a definitive package of liability for accidents in transport or at the site?

Mr. ESCHELS. No.

Senator ADAMS. Governor?

Mr. SAWYER. The answer is no to both questions, sir.

Senator ADAMS. Do any of the other witnesses wish to comment? The representative from Texas?

Mr. FRISHMAN. I agree that on both of those, the answer is no. In the transportation area, the major questions involving transportation right now, the key issues as the Department relates its rather vague schedules to me, the key issues are not even intended to be resolved until around 1995 or sometime after regarding mode of transportation, routes, and so on.

As far as liability, the Congress will I believe again this session take up that issue. The Department of Energy has discussed it with us and have been uniquely unhelpful in our positions.

Senator ADAMS. Thank you, Mr. Frishman.

The next question that I have is: You have made a proposal on behalf of the State of Washington, Mr. Eschels, to in effect move the process, not the policy—which as I understand it all of you have testified that you understand the difficulties with changing the policy, the exact statute—but moving the implementation of first the C & C agreements to in effect an outside agency with a resolution type person to sit over this and to try to get DOE to move forward so you might get some C & C agreements. Is that the Governor's proposal?

Mr. ESCHELS. Yes, but it will take more than the Department to move. I think everybody who has an interest has to come in and see that that interest is met.

Senator **Adams**. In other words, this is your positive suggestion to the Committee of how to move forward the C & C agreements which, as I understand it, all three of you have testified are at dead center at this point?

Mr. **Eschels**. Yes. We are unable to go forward with the C & C past the May 28 decision because of the legal problems, the technical problems, and the policy problems. My fear, and the reason we are putting this out, is without the pause, without the conflict resolution, we will in fact go to what Senator McClure called "square one," and perhaps beyond that, backwards.

Senator **Adams**. I see. Is it the opinion of the panel that the appropriation of additional money into this process will spend more time in reports and so on, but that there is very little chance of movement at this point without some outside influence coming into the process other than the Department of Energy? Is that correct?

Mr. **Eschels**. Yes.

Mr. **Sawyer**. Yes.

Mr. **Loux**. Yes.

Mr. **Frishman**. Yes.

Senator **Adams**. Do all the members of the panel agree to that?

Mr. **Eschels**. There has to be a change in attitude on the Department's part.

Senator **Adams**. Now when the Secretary was here he lamented, and maybe with some justification, that people in his Department did not like handling this matter, and I think he mentioned going to New Hampshire, and so on. Would you support the placing of site characterization as well as these C & C agreements which we have just gone through under an independent group outside of the Department of Energy, leaving the Department of Energy personnel perhaps to carry out the technical work?

Mr. **Eschels**. The objectives of the process that we are proposing are directed toward solving the near-term problem that the utilities have, and solving the Nation's long-term problem. The process of conflict resolution I think can address that question, and should. So it is not a requirement; it is also something that is not a necessary ingredient.

Senator **Adams**. I am concerned, and this goes to the specific facts that the Chairman mentioned on this site selection system, and it follows on with whether or not there should be a different way of implementing a policy and technical site selection system by somebody other than DOE.

It is my understanding that prior to the May 1986 decision that DOE itself issued stop-work orders in Nevada and Hanford because it was having so much problem collecting data. Is that correct?

Mr. **Eschels**. Yes.

Senator **Adams**. From Washington. From Nevada?

Mr. **Sawyer**. That is correct; yes.

Senator **Adams**. Well, now, if this happened, is that stop-order so far as you know still in effect?

Mr. **Eschels**. Yes.

Mr. **Sawyer**. It is still in effect.

Mr. **Loux**. Part of it is still in effect, yes.

Senator **Adams**. So we are in the process, if we put more money into this, of dealing with (1) no agreement with the States; and second, with DOE proceeding ahead with simply momentum on the site characterization in these areas, as opposed to collection of data. Is that correct?

Mr. ESCHELS. Yes.

Mr. SAWYER. I would say that is correct.

Senator ADAMS. Now I am concerned about the fact that the money that is going to be appropriated for this is going to be substantial. Is it not correct that the site at Hanford was by a quantum degree the most expensive site for selection?

Mr. ESCHELS. By several billions of dollars, yes.

Senator ADAMS. Now that partially is a result of the fact that there is a significant groundwater problem and already contaminated area. Is that correct?

Mr. ESCHELS. Yes, it is.

Senator ADAMS. Has there been a recent report, or have you had a recent series of meetings with the Department of Energy for the handling of both groundwater and defense waste that gives you any different statement on the amounts that would be required for characterization of that site?

Mr. ESCHELS. No, I do not have that information.

Senator ADAMS. In other words, we have been talking I think about a billion dollars for site characterization there, have we not? That that has been indicated by DOE?

Mr. ESCHELS. Oh, in round numbers, everyone refers to site characterizations as a billion dollars per site. But even within characterization, it costs much more to characterization Hanford than it would the other sites on the list, partly as you pointed out.

Senator ADAMS. That was what I wanted to know. You had no more recent figure.

Governor, do you have a more recent figure for Nevada, or are you still dealing with a round number of a billion dollars? And Mr. Frishman, the same question.

Mr. SAWYER. Mr. Loux will comment on that, Senator.

Mr. LOUX. Senator, we are still looking at the same sorts of numbers. We note that our review of the Environmental Assessment and related documents related to costs shows a number of discrepancies where in fact it looks like cost information may be included in the data that was manipulated in this whole process. There looks to be some wide discrepancies in numbers that do not seem to be justified, but, yes, I think that is the case.

Senator ADAMS. So we do not have at this point from any of the States a definitive either agreement or receipt of information from DOE of the costs for the individual sites for characterization?

Mr. ESCHELS. No. That is one of the things that we were asking for for those seven or eight months. I would indicate that in the draft Mission Plan, just as an aside, there is a change at the Hanford site in the two shafts which are planned to be excavated there.

The earlier Mission Plan indicated those would be six-foot diameter shafts, each. In the draft Mission Plan I am told that one of them will remain at six feet. The other would be changed to 10 or 12 feet in diameter, at least in part because of concerns with methane gas at depth. That will change the cost, but we do not know how much, yet. We have asked questions not only about the costs, but also about what does this change mean about the Hanford site.

Senator ADAMS. I guess the point is that you are not and have not as a State agency and as the Governor's office and the others been directly involved in receiving data on the methane gas, which I understand is below the surface there; the aquifer and the size of this, other than very informal contacts?

Mr. ESCHELS. That is correct.

Senator ADAMS. Is that correct? In other words, there is no formal exchange of data at that point?

Mr. ESCHELS. That is correct.

Senator ADAMS. Well, I want to join with the senior Senator from the State to say that this Senator and all others that we can similarly persuade will certainly be fighting in the Appropriations process before placing huge amounts of money into this process where we do not know, and have no information from the States involved, as to what the Department is going to do.

My final question, and if you would rather respond to it in writing that would be appropriate as far as I am concerned, is your suggestion as to what type of an outside agency should oversee, and what type of powers it should have for carrying out the site selection process over the Department of Energy and the obtaining of characterization agreements. It seems to me that that is what has been suggested, and that is what is being sent back to the Department of Energy; that there is no longer any confidence in the manner in which this policy is being carried out, and that we have to have someone else in this process.

So I would appreciate, if you wish to make any comments now, fine; if not, I would accept it in writing. That is my final question to the panel.

Mr. ESCHELS. My only comment is to reiterate what I said before, that the present course of the process I believe will not lead to a repository in this country. Rather than allow that to happen, and rather than allow two more years, and perhaps a billion dollars of ratepayer money to be wasted, we should pause in the process, go back far enough to get it back on track without undoing what was so painfully put together in the Congress in the Nuclear Waste Policy Act, and then go forward.

Senator EVANS [presiding]. I think it would be helpful to have that——

Senator ADAMS. I agree with that, that it would require a going back. Because from what you have testified, it is the implementation of the policy that has occurred almost from day one, and that there is not any point in putting any more money into having the Department of Energy fight with all of you, and slide guidelines, and if we end up with a nonrealistic policy and a nonrealistic implementation of the policy, this program will not only have been delayed for years and years, but there will not be any significant hope at the end of that delay that we really have in place what is necessary as a solution to the waste.

Senator EVANS. We would appreciate any further details in writing that you would submit.

[The information requested appears in the appendix.]

Senator EVANS. I notice that there is a vote call. The Chairman has gone over to vote. We thank the panel very much for your testimony. I think it has been extraordinarily helpful in this oversight, and in guidance to us in the next steps that we as a Committee and the Congress must take.

I will call for a temporary recess of the Committee until the Chairman returns, but the next panel should be ready to proceed:

Mr. Melvin Sampson, Chairman of the Yakima Indian Tribal Counsel; Mr. Del White, Chairman, Nez Perce Tribal Executive Committee; and Mr. Louie Dick, Jr., Chairperson of the Advisory Committee of the Nuclear Waste Study Program, Confederated Tribes of the Umatilla Indian Reservation.

If you three gentlemen will be prepared, we will resume as soon as the Chairman returns.

[Recess]

The CHAIRMAN [presiding]. The Committee will come back to order.

We would now like to welcome the representatives from three Indian Tribes, Mr. Melvin Sampson, Chairman of the Yakima Indian Tribal Council, from Toppenish, Washington; Mr. Del T. White, Chairman of the Nez Perce Tribal Executive Committee in Lapwai—do I pronounce that correctly?—Idaho; and Mr. Louis Dick, Jr., Chairperson of the Advisory Committee of the Nuclear Waste Study Program of the Confederated Tribes of the Umatilla Indian Reservation in Pendleton, Oregon.

Gentlemen, welcome.

Mr. Sampson, please begin.

STATEMENT OF MELVIN R. SAMPSON, CHAIRMAN, TRIBAL COUNCIL, YAKIMA INDIAN NATION, ACCOMPANIED BY RUSSELL JIM, MANAGER, NUCLEAR WASTE PROGRAM, YAKIMA INDIAN TRIBAL COUNCIL; AND DEAN TOWSLEY, LEGAL COUNSEL OF DISTRICT, YAKIMA INDIAN TRIBAL COUNSEL

Mr. SAMPSON. Thank you, Mr. Chairman.

For the record, I would like to offer that I have submitted a longer verse of our testimony here that we are presenting, and I will proceed with a condensed version of our presentation.

My name is Mel Sampson. I am Chairman of the Tribal Council of the Yamima Indian Nation, and also the Chairman of our Hazardous Waste Committee. And I would like to point out that I have accompanying me here today Mr. Russell Jim, who is the Manager of our Nuclear Waste Program; as well as Mr. Dean Towsley, who functions in a legal capacity here within the District for our program.

When Congress passed the Nuclear Waste Policy Act, it required extensive consultation and cooperation between the implementing Federal agencies and the affected Tribes and States. It required those agencies to take the concerns and views of the States and Tribes into account to the maximum feasible extent. The explicit purpose of these requirements was to promote public confidence in the integrity and competence of the program.

Today it is beyond question that the Department of Energy has utterly failed to inspire confidence in its program. How can there be any public confidence after revelations of internal DOE documents clearly revealing the baldly political basis for the postponement of the second repository siting process?

How can there be any public confidence in DOE's program after the revelations that showed the manipulation of the site selection process for the first repository in order to keep the worst site, Hanford, in the running?

The Department's documents acknowledge the last-place showing by the Hanford site, but brushed it off as insignificant. But earlier internal drafts of those documents show that Hanford's inferiority was not deemed insignificant by the technical experts who actually did the assessments. Those earlier drafts repeatedly conclude that the Hanford site comes in last under all reasonable circumstances.

There can be no confidence in the integrity of DOE's decisions when the very decision analysis expert who assisted DOE in doing its comparative assessment publishes a paper refuting DOE's contention that the inferiority of the Hanford site is insignificant. That expert, Dr. Ralph Keeney, demonstrates that the value of the information derived from characterizing the Hanford site can only amount to a tiny fraction of the cost of characterization, even under the most favorable assumptions.

Another expert in Decision Science who was a consultant to the National Academy of Sciences Board on Radioactive Waste Management in their review of DOE's Decision 1980 Methodology also felt that the results of the analysis were abused by DOE in reaching the decision to include the Hanford site. DOE is asking us to ignore the results of its comparative analysis which indicates Hanford is the worst site under consideration, and to accept instead the agency's premature and unfounded determination that the site is suitable in an absolute sense.

This is the opposite of a conservative approach. Our confidence in DOE's claims of suitability must be considered in context. We cannot consider the Department's actions in the civilian waste program in isolation. DOE and its predecessor agencies have assured us for the last 43 years that its operations at Hanford have not been environmentally damaging or hazardous.

Yet, we have been barraged in the recent months with a seemingly endless series of frightening revelations about decades of DOE's reckless environmental and safety practices at Hanford--over 40 years of accidental/intentional releases of large quantities of radioactivity to the earth, to the atmosphere, and to the waters that are so sacred to the Yakimas. We have learned that DOE contractors still release highly radioactive primary coolant water from the N-reactor to surface ponds right next to the Columbia River.

We have had our worst fears confirmed about DOE's intentions concerning deposition of 149 leaky single-shell tanks of high-level defense wastes, namely that they want to leave the remains of those tank wastes where they are, a permanent high-level waste repository just a few feet below the surface of the ground, and just a few miles from the Columbia River.

I might note that the 149 tanks, as I understand, is equivalent to 23,000 canisters.

We have also learned that the N-reactor at Hanford has numerous disturbing design similarities to the Chernobyl Reactor in the U.S.S.R., and that consultants hired by DOE to review the plant recommended drastic safety improvements or immediate shutdown of the plant; and that DOE has decided to disregard the most important of those consultants' recommendations.

We have further learned that DOE's enforcement of safety measures of its PUREX plant at Hanford are so lax that vital regulations have been violated regularly. We have learned that DOE contractors temporarily removed signs warning of roadside contamination at Hanford when the Governor of the State of Washington visited the site. DOE vigorously resists the application of Federal and State environmental protection laws to its facilities.

Finally, we have been alarmed by a whole series of GAO reports harshly critical of the environmental practices at DOE's facilities all over the country, and particularly at Hanford. The agency repeatedly demonstrates a reckless attitude about its assumed privilege to abuse the Hanford environment. DOE acts as if Hanford were a permanent national sacrifice area to be despoiled as the agency sees fit, or finds it convenient.

After this sorry history, how can the Yakimas, who hold that land and that river to be sacred, take any comfort in DOE's empty assertion that Hanford is suitable for a repository? Last week DOE announced that it was extending the deadline for operation of a first repository from 1998 to 2003. As a policy matter, we support this change as a long necessary concession to reality. However, this latest adjustment is very different from the Department's postponement of the second repository siting process.

A five-year relaxation of the deadline for the first repository is within the range of the slack that Congress has allowed the Department from the beginning of the Nuclear Waste Policy Act implementation. It is an improvement in the balance between the Act's deadlines and the need for technical excellence and meaningful consultation and cooperation with Tribes and States.

In sharp contrast, the indefinite postponement of a second repository siting activity is a clear violation, in our opinion, of the congressionally mandated progress toward finding a second repository site.

The Nuclear Waste Policy Act plan has not been followed by the Department of Energy, and today the program is in shambles. As a result of the agency's blatant political manipulation of its decisionmaking process, the credibility of both the Department and this program are nonexistent. The Department has failed in the Act's objective of dealing early and meaningfully with the concerns of both the States and the Indian Tribes.

Although DOE has awarded millions of dollars to States and Tribes to cover the costs of their participation in this program and spawned a great number of largely unproductive meetings, the Department has not dealt meaningfully with the concerns of the States and the Tribes. DOE has turned a deaf ear to other Federal agencies and Congress.

When the Nuclear Regulatory Commission submitted comments on the final EAs to DOE recently, the main message was that most of its draft EA comments still applied. When the NAS Board on Radioactive Waste Management recommended twice that the Department should involve outside experts in its Decision '80 methodology, DOE refused. Just last week, after every Member of this Committee expressed his conviction that DOE lacked the legal authority to postpone second repository siting, Secretary Herrington and Mr. Rusche still insisted to the contrary.

Our written testimony discusses DOE's illegal postponement of the second repository siting process, and distortion of the first repository site selection process in considerably greater detail than I have time for today. There is one aspect of that decision which I wish to bring to your attention, however.

In one of the three crucial manipulations which enabled DOE to keep the Hanford site in the running was to completely ignore cost considerations in clear violation of the Act. A Hanford repository, according to DOE's projections, would be over $5 million more costly than the other sites. To avoid the consequences of this fact, DOE simply asserts that costs are not important. But the Department takes exactly the opposite approach to cost considerations when considering options for disposal of its Hanford defense high-level waste where the agency seeks to justify its desire to exempt most of that waste from the repository disposal requirement. There, DOE seems to feel that cost considerations are extremely important.

What justifies this radical difference in the treatment of these two crucial matters? What should be done?

This program has been so fundamentally compromised by DOE that it is now dead in its tracks. Futile attempts to continue on the present course will only result in much more time and money being unnecessarily wasted. We feel that the Act itself already offers a mechanism for the necessary rethinking.

Section 303 of the Act requires the Secretary to undertake a study of alternative approaches to finance and manage civilian radioactive waste facilities. The panel, of which I was a member, published its final report in December of 1984, commonly referred to as the AMFM Panel, which was not notable for a lot of nuclear industry of DOE critics, and concluded two years ago that the Department of Energy's credibility and organizational flexibility and stability problems in this program were probably insurmountable.

Rather than sacrifice the program to those problems, the panel concluded "that the site selection process could be enhanced and made more credible by the use of a special advisory siting council comprised of representatives of all legitimate stakeholders."

It is no surprise that the Department of Energy did not e[illegible] herald this report. When it was completed, it was never given much attention by the Congress. We feel Congress could do much worse than to retrieve that report from its dust on the shelf and seriously consider what the panel had to say two years ago.

The ensuing two years have only affirmed the AMFM Panel's conclusion that DOE does not have what it takes to implement this program successfully. While the specific recommendations probably need to be updated, there is still much to be gained from the report's analysis and conclusions.

In concluding, the Yakima Indian Nation is gravely concerned about the DOE's implementation of the Nuclear Waste Policy Act. Through political maneuvering, DOE has mangled the Act's objectives of inspiring confidence in its program in locating two safe and suitable places in which to bury this Nation's waste. We trust that you will use the testimony presented today to get the program back on track, and I want to thank you for this opportunity to make this presentation, Senator.

[The prepared statement of Mr. Sampson follows:]

UNITED STATES SENATE
COMMITTEE ON ENERGY AND NATURAL RESOURCES

Hearing on the Status of the
High-Level Radioactive Waste Disposal Program

February 4, 1987

STATEMENT OF MELVIN R. SAMPSON
TRIBAL COUNCIL CHAIRMAN
ON BEHALF OF THE YAKIMA INDIAN NATION

Mr. Chairman, members of the Committee--

My name is Melvin Sampson. I am Chairman of the Tribal Council and Chairman of the Nuclear and Hazardous Waste Committee of the Ya~~kima~~ In~~d~~ian Nation. I have also served on former Energy Secretary Donald Hodel's Advisory Panel on Alternative Means of Financing and Managing Radioactive Waste Disposal pursuant to section 303 of the Nuclear Waste Policy Act, and on the State of Washington Nuclear Waste Advisory Council, a citizens' panel that advises the State Nuclear Waste Board and the governor on nuclear waste issues. On behalf of the Yakima Nation, I wish to thank you for this opportunity to address the Committee once again about the status of the federal high-level nuclear waste disposal program.

The Yakima Nation is an affected Indian tribe with respect to the proposed Hanford repository site in Washington State. The Yakima Indian Reservation is thirteen miles from the Hanford Site at the closest point, and most of the Hanford Site is on Yakima Ceded Lands. Under the Treaty of 1855 the Yakimas retain hunting, grazing, and food gathering rights on those Ceded Lands and fishing rights at usual and accustomed places on the rivers and streams which pass through them, including the Columbia and Yakima Rivers. It is on the basis of these treaty rights that the Secretary of Interior determined in March of 1983 that the Yakima Nation is an affected Indian tribe under the Nuclear Waste Policy Act, and found that these treaty rights would be affected by the location of a nuclear repository at Hanford.

When Congress went through the arduous process of fashioning a comprehensive plan for resolution of the nation's long-standing nuclear waste problem, it explicitly recognized that past federal efforts in this area had been inadequate. Congress also recognized that the primary reasons for the failure of earlier federal efforts was failure on the part of the federal government to seriously deal with very real technical questions about the geologic adequacy of prospective repository sites, and failure to address the concerns of state, tribal, and local governments in the repository selection and development process.

Congress addressed both of these historic failings in federal nuclear waste management efforts when it passed the Nuclear Waste Policy Act in 1982. The question of site suitability was addressed by the requirement that sites for potential repositories be selected on the basis of technically-grounded siting guidelines, and that the primary criteria for the selection of sites must be "detailed geologic considerations." The issue of state and tribal government involvement was addressed by one of the most elaborate participation schemes ever devised by federal statute.

Congress required extensive consultation and cooperation between the federal agencies and the affected tribes and states, and required those agencies to take the concerns and views of the states and tribes into account to the maximum feasible extent. The explicit purpose of these requirements was to promote public confidence in the integrity and competence of the program. Congress wisely acknowledged that it was essential to enable the states and tribes to be involved meaningfully in the implementation process from the beginning, in the hopes that their concerns would be addressed in a meaningful way, thus reducing the likelihood the program would be thwarted by political opposition and desperate litigation on the part of frustrated and ignored state and tribal governments.

From the implementation of the Act to the present, however, DOE has constantly chipped away at the Act's mandate for meaningful dialogue between DOE and the affected states and tribes in order to instill confidence in the nuclear waste disposal program. Today, there can be no question but that the Department has utterly failed to inspire confidence in its program. How can there possibly be any public confidence after revelations of internal DOE documents clearly revealing the baldly political basis for the postponement of the second repository siting process? The Department obviously decided that it was worth engaging in an "obvious political ploy", and "demonstrating the success mode of resistance", in order to obtain "immediate political relief" from eastern and midwestern states.

How can there possibly be any public confidence in the integrity of DOE's program after the revelations that showed the crass manipulation of the site selection process for the first repository in order to keep the worst site--Hanford--in the running? Even DOE's analysis shows the marked inferiority of the Hanford site compared to the others. The Department's final documents acknowledge the last-place showing by the Hanford site, but casually brush it off as insignificant. But earlier internal drafts of the Decision Aiding Methodology and the Recommendation Decision--found in DOE's files by the Weaver-Markey investigation after DOE repeatedly denied to Congressional committees that such materials existed--show that Hanford's inferiority was not deemed insignificant by the technical experts who actually did the assessments. Those earlier drafts repeatedly concluded that the Hanford Site comes in last place under all reasonable circumstances, an assessment that has long been held by virtually all independent earth scientists, as well as many who have worked under contract to DOE. Such strong negative conclusions about Hanford were systematically deleted from the agency's final documents, the Weaver-Markey report reveals.

There can be no confidence in the integrity of DOE's decisions when the very decision analysis expert who assisted DOE in doing its comparative assessment publishes a paper absolutely refuting DOE's contention that the inferiority of the Hanford site is insignificant. That expert, Dr. Ralph Keeney, demonstrates that the value of the information derived from characterizing the Hanford site can only amount to a tiny fraction of the cost of characterization, even under the most favorable assumptions.

Another expert in decision science who was a consultant to the NAS Board on Radioactive Waste Management in their partial review of DOE's Decision Aiding Methodology, Dr. Detlof von Winterfeldt, also felt that the results of the analysis were badly abused by DOE in reaching the decision to include the Hanford site. He wrote a strongly worded letter of protest to Waste Management Director Ben Rusche about it. DOE apparently sent an emissary to California to try to talk Dr. von Winterfeldt out of his embarrassing (to DOE) stance, but to no avail. He sent yet another letter reaffirming his view that the analysis clearly showed that the Hanford Site should not have been recommended for characterization.

DOE is asking us to ignore the results of its comparative analysis, which indicate Hanford is the worst site under consideration, and to accept instead the agency's premature determination that the site is "suitable" in an absolute sense. This is precisely the opposite of a conservative approach.

The potential confidence of the Yakima Indian Nation in DOE's claims of suitability of the Hanford Site must be considered in context. We who retain rights in the land that is now called Hanford cannot consider the Department's actions in the civilian radioactive waste program in isolation. Our reservation is too close to Hanford and our rights are too important for us not to examine the past practices of DOE. The agency that assures us today of the suitability of Hanford for a high-level waste repository is the same agency that has assured us for 43 years that its operations at Hanford have not been environmentally damaging.

Yet we have learned in the past year of over 40 years of both accidental and intentional releases of large quantities of radioactivity to the earth, the atmosphere, and the waters that are sacred to the Yakimas. This is the same agency that for nearly three decades used the Columbia River for once-through cooling of its reactors, and that to this day still releases highly radioactive primary coolant water from the N-reactor to surface ponds right next to the river.

This is the same agency that for 30 years put liquid, high-level wastes in single-shell tanks just below the surface of the ground, and assured us that the practice was safe, only to have many of those tanks leak their deadly contents into the soil. Even worse, this is the agency that has made known its desire to leave the remains of those single-shell tank wastes right where they are--a permanent high-level waste repository just a few feet below the surface of the ground, and just a few miles from the Columbia.

This is the same agency that has told us repeatedly that its N-reactor posed no threat to our environment. Yet when consultants hired by DOE to review N-reactor operations in light of the Chernobyl accident recently recommended either drastic safety improvements or immediate shutdown of the N-reactor, DOE decided to disregard the most important of those consultants' recommendations and implement only very limited repairs, which do not address serious safety concerns about hydrogen gas generation and radionuclide containment raised by their own consultants.

This is the same agency that permits enforcement of safety measures at its PUREX plant at Hanford to become so lax that vital criticality prevention regulations have been violated almost as a matter of course, and the facility has been repeatedly shut down because of accidents and safety problems. This is the agency that temporarily removed signs warning of contamination when the Governor came through for a visit. This is the agency that has come under close congressional scrutiny this year through an endless series of GAO reports harshly critical of the environmental practices at its facilities all over the country, and particularly at Hanford. This is the agency that has vigorously fought against the application of federal and state environmental protection laws to its facilities, and that continues to resist EPA and state enforcement of the Resource Conservation and Recovery Act with respect to those facilities.

In short, this agency has unfortunately been shown to ignore the environment, with a recklessly cavalier attitude about its assumed privilege to abuse the Hanford environment. DOE acts as if Hanford were a permanent national sacrifice area, to be despoiled as the agency sees fit or finds convenient.

Under these circumstances, after this history of decades of hollow reassurances and regular environmental depredations at Hanford, how can the Yakimas, who hold that land and that river to be sacred, regardless of past and present contamination, take any comfort in DOE's empty assertion--against the weight of available evidence--that Hanford is "suitable" for a repository? Much more convincing--and meaningful--is the agency's weak acknowledgment that Hanford is the worst site of those considered. We must ask, did Congress go through the years of turmoil that were required to pass the NWPA just to have DOE squander its resources and its chances for success on the worst site?

Last week DOE issued a Draft Mission Plan Amendment, and announced that it was extending the deadline for waste acceptance at a first repository from 1998 to 2003. As a policy matter we support this change as a necessary acknowledgment of the inevitable. We hasten to emphasize, however, that this latest ajustment is in no way analogous to the Department's illegal postponement of the second repository siting process. A five year relaxation of the deadline for first repository operation is within the range that Congress has historically allowed the Department from the beginning of NWPA implementation. Moreover, it represents an improvement in the balance between the Act's deadlines on the one hand, and the need for technical excellence and meaningful consultation and cooperation with tribes and states on the other. In sharp contrast, the postponement of second repository siting activities is a complete and illegal cessation of the Congressionally-mandated progress toward finding a second repository site.

The Department has failed to satisfy the consultation and cooperation requirements of the NWPA, and thus has utterly failed in the Act's objectives of inspiring confidence and dealing early and meaningfully with the concerns of states and Indian tribes. The recently announced five-year extension for first repository development makes the possibility of meaningful consultation and cooperation somewhat less remote, but that step is far from sufficient. Secretary Herrington, when he testified before this Committee last week, acknowledged that the Department needs to do better in its C & C efforts. This concession is less meaningful than it should be, however, because DOE representatives have been saying the same thing to Congress and to us for four years, with no signs of improvement.

Yes, DOE has awarded millions of dollars to states and tribes to cover the costs of their participation in this program, as required by the Act. The states and tribes have used those funds for serious, good faith reviews by qualified technical, policy, and legal experts of the DOE's studies, plans, and other documents.

At the same time, DOE has spawned an impossible proliferation of meetings at which the state and tribal representatives are told a small portion of what the Department and its contractors are doing, and treated to endless slide shows and viewgraphs. Millions have been spent on travel to these ceaseless meetings, and DOE will undoubtedly present you with an impressive looking list of meetings and comments which it will represent as consultation and cooperation with the states and tribes.

But the Department has not dealt meaningfully with the concerns of the states and tribes, as required by the NWPA. The Department has never been willing to discuss its plans with the states and tribes before it reaches decisions. Indeed, the Department has largely ignored what anybody else has had to say substantively about its conduct of this program.

Moreover, this tendency by DOE not to heed the recommendations of others has not been limited to the views of states and tribes. DOE has also by and large ignored the advice and comments of other federal agencies and Congress. When the Nuclear Regulatory Commission submitted comments on the final Environmental Assessments to DOE recently, the prevalent message was that most of its draft EA comments still applied. In other words, most of NRC's comments on the draft EAs were not heeded by DOE in preparing the final EAs. When the National Academy of Sciences Board on Radioactive Waste Management, in reviewing DOE's so-called Decision Aiding Methodology, recommended twice that the Department should involve outside experts in the process, DOE refused to implement that suggestion.

Your hearing last week with Secretary Herrington offers another excellent example of DOE's willful deafness. After a couple hours of being told by every single Senator present that the Department did not have legal authority to postpone second repository siting, the Secretary and Mr. Rusche still insisted to the contrary. Congress reaffirmed its desire to see C & C agreements concluded between DOE and states and tribes in its appropriations actions last fall. Last week's testimony by Secretary Herrington demonstrated the same DOE stubbornness and refusal to hear crystal clear messages which causes feelings of frustration and anger by Indian tribes and states. Needless to say, such feelings, which characterize most of our dealings with the Department, are not conducive to productive negotiations.

Perhaps the best indication of the level of public confidence in DOE's actions in the nuclear waste program is the fact that practically nobody has passed up the opportunity to seek judicial review of those actions. The decision to file suit was a difficult one for the Yakima Nation. Funds to get involved in litigation are not high on the list of economic priorities for our tribe, which suffers a 70 percent unemployment rate. In the end, our Tribal Council, the executive governing body, nonetheless concluded that the Yakima Indian Nation had no choice but to challenge DOE's illegal actions in court. The agency has largely ignored our concerns with impunity for four years. They have violated the NWPA, as well as the federal government's trust responsibility to our tribe, in many fundamental respects. We simply could not let these violations pass without asserting our rights, and we have no doubt that those rights will be upheld in court.

What Should Be Done?

This program has been so fundamentally compromised by DOE that it is now dead in its tracks. Futile attempts to continue on the present course will only result in much more time and money being unnecessarily wasted. Congress has been largely unwilling to rethink the NWPA up to this point, but its appropriations actions last fall indicate a healthy new skepticism has developed.

We feel the NWPA itself already offers a mechanism for the necessary rethinking. Section 303 of the Act required the Secretary to undertake a study of alternative approaches to finance and manage civilian radioactive waste facilities. Unfortunately, then Secretary Hodel waited nearly a year, until the deadline for the study had passed, before appointing an advisory panel to do the study. The panel, of which I was a member, published its final report in December 1984. Needless to say, by that time the program already was so far advanced that recommendations for fundamental change had little prospect of implementation. On the other hand, the late timing of the so-called AMFM Panel's deliberations gave it the advantage of having a couple years of DOE management to look at.

The AMFM panel--which was not notable for a preponderance of nuclear industry or DOE critics--concluded even two years ago that the Department of Energy's credibility and organizational flexibility and stability problems in this program were probably insurmountable. Rather than sacrifice the program to those problems, the panel concluded that "the site selection process could be enhanced and made more credible by the use of a special advisory siting council comprised of representatives of all legitimate stakeholders."

It is no surprise that the Department of Energy did not exactly herald this report when it was completed, and as far as we are aware, it was never given much attention in Congress. We feel Congress could do much worse now than to retrieve that report from its dust on the shelf and seriously consider what the panel had to say two years ago. The ensuing two years have only affirmed the AMFM panel's conclusion that DOE does not have what it takes to implement this program successfully. While the specific recommendations probably need to be updated, there is still much to be gained from the report's analysis and conclusions.

Following are the Yakima Indian Nation's detailed comments on DOE's manipulation of the first repository site selection process, and on the Department's postponement of the second repository program.

DOE's First Repository Site Recommendation Decision is Fatally Flawed

When Congress enacted the NWPA, it had reason to expect that, if not the very best, certainly one of the best sites in the nation from the standpoint of geologic considerations would be chosen for the first nuclear waste repository. How has it happened that Hanford, which would be on no objective geologist's or hydrologist's short list of possible sites, is one of DOE's three chosen locations? In our view, the objectives of Congress have been corrupted because, rather than attempting to select the best site, DOE, aided by contractors who have a huge economic interest in having their site stay in the running, is bent on proving all the first-round sites acceptable so that the agency's maximum "flexibility" can be maintained.

One of the best examples of the failure of DOE's conduct of the repository siting program is the absurd contortions the agency goes through in order to keep the Hanford Site among those recommended for characterization. The suitability of Hanford for a repository has long been questioned by most knowledgeable observers and most earth scientists. The National Academy of Science Board on Radioactive Waste Management, DOE's own BWIP Hydrology/Geology Overview Committee, the U.S. Geological Survey, and many highly-respected individual scientists from those organizations and the Nuclear Regulatory Commission have all at various times expressed their serious technical misgivings about the suitability of a site in totally saturated, highly fractured, highly-stressed basalt rock just a few miles from the nation's second largest river, the Columbia. Hanford is the only site where the repository would become totally saturated in groundwater within a very short time after repository closure.

Even DOE's much-touted "Decision Aiding Methodology" could not avoid ranking Hanford dead last among the nominated sites for both postclosure and preclosure guidelines. DOE's analysis shows that:

-- Hanford has the worst expected postclosure performance by orders of magnitude (at least a factor of 50).

-- Hanford has by far the greatest uncertainty associated with its projected postclosure performance.

-- Hanford ranks fifth (last) in overall pre-closure considerations, far behind the other four sites.

- Hanford is expected to be by far the most costly site (by over $5 billion) in terms of both repository and transportation costs.

- The Hanford site would have the greatest occupational risks to repository workers by far.

DOE is able to recommend Hanford for characterization in spite of its distant last-place showing in the comparative analysis only by engaging in three serious and illegal distortions of the site selection process:

1) DOE brushes off Hanford's vast inferiority in projected post-closure performance in violation of the NWPA requirement that detailed geologic considerations should be the primary selection criteria;

2) DOE totally discounts cost and transportation considerations in flagrant violation of the NWPA; and

3) DOE elevates "diversity" of rock types to the primary selection criterion, totally overwhelming consideration of technical merit, also in violation of the NWPA.

Hanford Postclosure Inferiority

DOE's post-closure performance analysis yields the significant result that radioactivity releases from the Hanford Site to the accessible environment are projected to be higher by at least a factor of 50 than all the other sites. The Yakima Nation's technical consultants advise us that the actual difference is even greater than DOE admits. But DOE dismisses the significant inferiority of the Hanford Site because supposedly even Hanford radioactive releases will be orders of magnitude below the EPA standards. In other words, DOE dismisses this large comparative difference on the basis of its projection of absolute excellence for all the sites. (DOE gives all the sites scores above 99.7 on a scale of 1 to 100. The contention alone that all the sites are so close to perfection and so close together should be sufficient to reveal the absurdity of this analysis.)

DOE acknowledges that there is great uncertainty in its preliminary projections of postclosure performance at the sites. If, as we believe, DOE is greatly over-optimistic about releases at all the sites (that is, if all the sites are worse than DOE thinks by the same factor, a distinct possibility according to USGS and NRC), then the actual Hanford releases could be at or above the EPA standards, while the other sites would still be orders of magnitude below them. It does not require a scientific background to realize that the margin for error and, thus, the margin of safety, is much, much less for the Hanford Site than for the other sites. Beyond this, DOE acknowledges that the uncertainty about performance at the Hanford Site is actually much greater than at all other sites, because of the complex geologic and hydrologic environment at Hanford. Therefore, the possibility that they are way off in their performance projections is the greatest at Hanford.

Obviously, it is grossly non-conservative from a geologic perspective to dismiss this large difference in the margin of safety among the sites. Since section 112(a) of the NWPA requires that detailed geologic considerations should be the primary criteria for the selection of sites, DOE's decision is clearly inconsistent with the NWPA.

Hanford Preclosure Inferiority

In order to justify its selection of Hanford, DOE simply ignores relative costs, which are much higher for Hanford than for the other sites. (DOE has admitted in a letter to the Chairman of the House Energy and Commerce Subcommittee on Energy Conservation and Power that the excess cost of developing a repository at Hanford is actually over $5 billion, rather than $4 billion as reported in the Decision Aiding Methodology. DOE was unable to satisfactorily account for the discrepancy.) While DOE's siting guidelines call for cost considerations to be given the least weight among pre-closure guidelines, DOE is able to get Hanford to rank in the top three in pre-closure considerations only by ignoring costs completely.

This is not permissible under the NWPA. Section 112(a) requires the siting guidelines to "take into consideration the proximity to sites where high-level radioactive waste and spent nuclear fuel is generated or temporarily stored and the transportation and safety factors involved in moving such waste to a repository." This section also requires the Secretary "to consider the cost and impact of transporting to the repository site the solidified high-level radioactive waste and spent fuel to be disposed of in the repository and the advantages of regional distribution in the siting of repositories." Clearly DOE may not ignore cost considerations under the Act, but that is precisely what the agency had to do in order to rationalize its recommendation of the Hanford Site for characterization for a repository.

It is interesting to note that the Department takes exactly the opposite approach to cost considerations in the Draft Environmental Impact Statement for Disposal of its Hanford Defense High-Level Wastes. In that context, where the agency seeks to justify its desire to exempt most of that waste from the repository disposal requirement, DOE seems to feel that cost considerations are extremely important. It would be valuable to hear the Department explain why costs are so overwhelmingly important when it comes to selecting alternatives for defense waste disposal, but not important at all (a $5 billion difference is dismissed) when it comes to selecting among alternative repository sites. Nuclear utilities might do well to question whether the Department is applying less rigorous cost-justification standards where the Nuclear Waste Trust Fund is concerned than where Treasury funds are concerned.

Moreover, in order to rank Hanford first in pre-closure considerations after ignoring costs in violation of the Act, DOE unjustifiably underestimates environmental and socioeconomic effects at Hanford relative to the other sites. For example, DOE virtually ignores the tribal issues of greatest concern to the Yakimas such as loss of access to and desecration of Indian religious sites, damage to archaeological resources, effects on Indian subsistence lifestyle, and the tribe's extraordinary cultural risk-aversion with respect to environmental threats to the land, the fish, and other natural resources that are central to their religion and their way of life. These are issues we have raised repeatedly in every possible forum to DOE. It is insulting and, we believe, unlawful, for these issues to be so cavalierly brushed aside.

Undue Emphasis on Rock Diversity

The NWPA calls for the recommendation of sites in diverse geologic media only to the extent practicable. Diversity can be a useful consideration in distinguishing among comparable sites, but should not be used as an excuse for the selection of inferior sites. If fractured, stressed, saturated basalt adjacent to a major river were comparable to the other site types in terms of geologic performance measures, diversity might be an adequate basis for its selection. In fact, even DOE's analysis shows that the basalt site is significantly inferior to the other sites in both post-closure and pre-closure considerations. Even giving due weight to the advantages of diverse media, the "suite" of sites for characterization is manifestly not improved by including in it the site which has by far the greatest uncertainty associated with it (in spite of the vastly greater study that has occurred there relative to the other sites), and which is obviously by far the least likely to prove suitable of all those considered.

Well before Congress spoke on the subject in comprehensive legislation, DOE had decided that it would be convenient to put a repository at Hanford, since DOE already controls the land, and employs a large number of persons in the area. Geologic considerations had next to nothing to do with the choice. It is beyond serious dispute that, were the geologic suitability of the site the main criterion, Hanford would be on no-one's list of top choices for a repository.

In the draft EA's, DOE attempted to justify selection of Hanford on the absurd argument that Hanford is one of the three best sites. Reality has intervened at least to the extent that the agency has now dropped that rationale. Now, in the Final EA and its accompanying documents, DOE still recommends Hanford, in spite of a newfound admission that it is the worst site considered. This time around, the Hanford Site is a winner on the basis of an arguably more plausible but legally improper overemphasis on rock "diversity." That the rationale keeps changing while the decisions remain the same is a good indication of the kind of science that undergirds decision-making in this program.

Second Repository Postponement

DOE's announced "indefinite postponement" of the second repository siting program is not within the agency's discretion under the NWPA. The NWPA sets a non-discretionary deadline for DOE to nominate and recommend sites for characterization for the second repository. It also sets a non-discretionary deadline for the President to recommend a site for a second repository to Congress.

DOE has announced that if and when it does resume the second repository siting process, it will start the site screening process from scratch. Why throw away all the considerable work that has been done and money that has been spent to date on second repository siting, unless political motivations were behind the postponement? The administration desperately wanted the candidate areas for the second repository to feel, at least temporarily, that they are completely off the hook.

DOE is telling us that its second repository siting efforts, which, in contrast to the first round, were based at least nominally on a comprehensive national screening using the Department's siting guidelines, are not worth saving. We have not specifically reviewed those efforts, and given the inadequate guidelines, we cannot argue with that conclusion. Indeed, if they are no better than the first repository siting program has been, then clearly they are not worth saving.

On the on hand, DOE is foreclosing valuable options by stopping the second repository program, and tossing out all the work that has been done. At the same time, the agency is arguing that the success of the entire waste management program should depend on the sufficiency of its first repository siting effort together with an MRS. That effort started without any kind of valid national screening, with two of the three sites initially chosen on geologically irrelevant grounds, without the benefit of siting guidelines prescribed by the NWPA. Indeed, the essence of this charade is illustrated by the fact that, under DOE's current plan for administration of this program, the siting guidelines, which took nearly two years to develop, will probably never be used at all. In sum, the first repository siting process has been as political and unscientific as it could possibly be. We must ask, is that the basket where Congress really wants to put all of its nuclear waste management eggs?

From a political standpoint, calling DOE's action a "postponement" rather than a "cancellation" is mere semantic sleight-of-hand. Even if the agency is being truthful when it claims it does not wish to do so, destroying the NWPA-mandated ongoing momentum toward construction of a second repository now makes the eventual complete cancellation of the second repository virtually inevitable. To resume the second repository siting program in the 1990's after ten or more years of inactivity would require much the same political capital that went into initial passage of the NWPA. It was possible to initiate momentum toward the siting of two repositories as part of the grand compromise that is the NWPA; it will be much harder--if not impossible--to separately resume progress toward a second repository once the first is an accomplished fact.

The possible elimination of a second repository also has major implications for the Department's ultimate disposal of its defense wastes. The pressure on repository size limitations that would result from the construction of only one repository could cause untoward pressure on DOE to seek to implement inadequate disposal options for its defense wastes (such as leaving them in place just below the ground surface in spite of their comparable risks to other wastes slated for deep geologic disposal). The defense waste management decisions should be free of such pressures.

In conclusion, the Yakima Indian Nation is gravely concerned about DOE's implementation of the NWPA. Through political maneuvering, DOE has mangled the Act's objective to locate two safe and suitable places in which to bury this nation's waste. We trust that you will use the testimony presented today to get the whole program back on track.

Senator EVANS. Thank you very much, Mr. Sampson.
Mr. White, please proceed.

STATEMENT OF DEL T. WHITE, ASSISTANT SECRETARY/TREASURER, NEZ PERCE TRIBAL EXECUTIVE COMMITTEE ACCOMPANED BY RONALD T. HALFMOON, MANAGER, NUCLEAR WASTE POLICY ACT PROGRAM; AND KEVIN GOVER, SPECIAL COUNSEL TO THE TRIBE REGARDING NUCLEAR WASTE POLICY ACT ISSUES

Mr. WHITE. Thank you, Mr. Chairman.

I would like to make one correction to your statement, that I am not the chairman of our Tribal Council. I am an officer of the Tribe, but in the capacity as Assistant Secretary/Treasurer of the Tribe.

Senator EVANS. I see. The record will so show the change.

Mr. WHITE. Mr. Chairman, Members of the Subcommittee, my name is Del White. As I said, I serve as the Chairman of the Nuclear Waste Subcommittee of the Nez Perce Tribal Executive Committee. Coming with me today is Ron Halfmoon, who is the manager of the Nuclear Waste Program of our Tribe; and Kevin Gover, our special counsel to the Tribe regarding nuclear waste issues.

We are pleased to have the opportunity to present the views of the Nez Perce Tribe for the consideration of the Committee. I might add that we concur with the Tribes and States in their position regarding the May 28 decision, but our testimony is more or less focusing on the C & C issue.

I will start off, Mr. Chairman, that we believe that the Department's Nuclear Waste Policy Act program is not good, as has been reiterated by the previous panel before us. DOE's credibility seems to be beyond rehabilitation. This is ironic as the DOE statute is charged with executing extensive provisions designed to enhance the Department's credibility with the public.

The following details our major concerns regarding DOE's execution of the Nuclear Waste Policy Act. We are unable to comment in detail on DOE's proposed amendments to the Mission Plan due to the Department's failure to issue those amendments for review in a more timely manner. We will provide our preliminary assessments of the following:

(1) The provisions regarding the C & C, the Consultation and Cooperation requirements;

(2) The rationale for the decision to postpone indefinitely site-specific work for the second repository;

(3) The revised schedule for the characterization of the three first-round sites, and for filing a license application with the NRC.

I will now expand on the Consultation and Cooperation. The C & C provisions of the Nuclear Waste Policy Act should form the basis for the relationship between affected Tribes and States on the one hand, and DOE on the other. If DOE had faithfully abided by the letter and spirit of these provisions, the program would not be in the difficulty that it now faces, because DOE seems unwilling and perhaps incapable as an institution of allowing the broad public participation required by the Act and is under fire from every party which it must deal with.

We are most disappointed with the Department's statement regarding C & C in the Mission Plan amendments. The Department proposes few new initiatives, and its report of events is less than complete. We had hoped as a Tribe that the proposed amendments to the Mission Plan would mark a new point of departure for DOE's C & C efforts. What is reflected, instead, is the Department's continuing inability to comprehend what constitutes a meaningful consultation and cooperation.

Nevertheless, the C & C remains a central component of the Nez Perce Tribe's nuclear waste program. As you know, the Nuclear Waste Policy Act is not always clear in its effect or its intent. This is particularly true in connection with the rights of affected Indian Tribes under the Act. Our primary reason for focusing on the possibility of C & C negotiations is that we believe such negotiations and any agreement that may result will clarify and ensure the broad Tribal rights of participation that Congress has intended.

In our efforts to commence C & C negotiations we have observed the following:

First, DOE consistently acts so as to provide the least possible consultation in the process.

Second, DOE instinctively interprets any ambiguities in the Nuclear Waste Policy Act so as to minimize Tribal and State rights of participation under the statute.

Two experiences of the Nez Perce Tribe form the basis of our views. Late last summer the Tribe learned that DOE had preliminarily determined that the Tribe was ineligible for any assistance under section 118(b) of the Act designed to mitigate adverse impacts to Tribal interests. Prior to August, the Tribe had been given no indication that the Department doubted the Tribe's eligibility for such assistance.

Although the decision was never made final and never was explained fully, DOE's contract officers enforced the determination in negotiations with the Tribe on our fiscal year 1987 grant funding. Despite repeated Tribal protests, DOE seemed unwilling to reconsider what had been, after all, only a preliminary determination, or even to make that determination final and reduce it to writing.

Finally, on October 17 the Tribe demanded initiation of a process for the final resolution of the issue. The process demanded by the Tribe required consultation with the Tribe at key points in the decisionmaking process. The Umatilla and Nez Perce Tribes prepared a lengthy document in response, demonstrating that the legislative history of the Act supported the Tribe's claim of eligibility.

At this point, the process fell into some disarray. The Tribes had proposed then a step-by-step process. After submitting the response to DOE-Richland, that position paper, but before consulting with DOE-Richland, the Tribes learned that DOE headquarters already had the question under review.

In spite of this breach of the procedure agreed upon, the ultimate result was favorable to the Tribes. DOE now has ruled that the Tribes are eligible for assistance under section 118(b). Nevertheless, the entire affair demonstrates the points made above. DOE imposed on the Tribes a decision made without consultation dramatically narrowing Tribal rights under the Act. The decision reflected a narrow statutory interpretation apparently designed to limit Tribal participation.

True consultation requires Tribal input before controversies reach the policymaking level of the Department. It requires that DOE personnel explain the decisions, and that the Tribe be given an opportunity to respond before the Department's position hardens. It requires direct communication between Tribal and Departmental policymakers. These hard-won lessons, however, already are in jeopardy.

The Tribe recently learned that DOE will determine whether all of the provisions of section 117(c) apply to the Tribes. DOE has not requested Tribal input on this matter, and again the Tribes have been forced to demand consultation.

These issues of statutory intepretation unfortunately have delayed the initiation of C & C negotiations' process between the Tribe and DOE. The Tribe was most pleased with the disposition of the impact assistance issue, but we do have lingering concerns regarding the decisionmaking process.

Our satisfaction, however, is tempered by the emergence of the issue concerning Tribal rights of participation under section 117(c). DOE announced at a December meeting of the Institutional Socioeconomic Coordinating Group that it was reviewing the question of whether C & C agreements with affected Tribes could include all of the 11 elements listed in section 117(c). That the Department should now entertain doubts on this issue is made doubly unfortunate by the fact that DOE personnel from both Richland and headquarters had assured the Tribe that each of the 11 items would be appropriate to be included in the C & C agreement.

Significantly, Tribal eligibility on each of the 11 areas is one of the several principles the Chairman of our Tribal Council, Mr. Reuben, has asked Secretary Herrington to acknowledge in the Chairman's letter of December 15 conditionally inviting negotiations. That letter requested Secretary Herrington's acknowledgment of five principles before negotiations will begin.

Number one would be the Tribe has a critical interest in maintaining the environmental integrity of the Columbia River and its tributaries.

Number two, the Tribe has a critical interest in protecting the natural resources in the Tribe's possessory and usage rights area.

Number three, by virtue of its treaties with the United States, the Tribe has prior and paramount reserved rights to certain natural resources.

Number four, as acknowledged in the President's policy statement of January 1983, a government-to-government relationship exists between the United States and the Tribe.

Number five, the provisions of section 117 do not constitute a limitation on the contents of a C & C agreement.

Items one through four we regard as truisms supported by undeniable facts and two centuries of American jurisprudence. We hope and expect that the Secretary will not find them to be problematic.

Number five of course involves the section 117(c) issue noted above.

The Tribe is gratified that, given an opportunity to provide meaningful input into DOE decisionmaking as in the case of impact assistance, the Tribe's views can influence departmental action. This tells us that DOE is not completely hostile, and that there exists within the Department at least a few people who are committed to the principle of broad public participation. We commend those people and urge their superiors to adopt that commitment.

At the same time, these events demonstrate that the Department's commitment to Consultation and Cooperation has not yet reached the point where the Department's decisionmakers routinely seek input from Tribes and States and the public before making decisions, and that until such consultation is universal the relationships between DOE and the affected Tribes and States will remain essentially adversarial.

A current example of this fact common to all the States and Tribes involves the formulation of amendments to the Consultation and Cooperation section of the Mission Plan. At the last quarterly meeting of Tribes, States, and the DOE, the Tribe requested that any future proposed amendments to the Mission Plan be formulated in consultation with the Tribes and States before their public release.

The reaction of DOE headquarters personnel was scornful, and the request was rejected out of hand. It is self-evident that when an individual at the top level reacts with scorn to Tribal and State input on so important a matter, the commitment of those individuals to Consultation and Cooperation is absent, and that their value to the Department and to the ultimate goal of developing a repository is highly doubtful.

Signals indicating the possibility of a change for the better seem to be not evident. Departmental representatives met in November with representatives of the affected parties to discuss proposed amendments to the proposed Mission Plan. This meeting did not result in meaningful proposals to amend the C & C process and the Mission Plan. This reflects the Department's lack of commitment. It also indicates that those people in the Department who seek improvement in the C & C process are overruled by their superiors when the time comes for true reform.

All too often commitments made by those who work most closely with the Tribes and States are reversed at higher levels. We can only conclude that those higher levels lack any commitment to carrying out the C & C provisions of the Act. We also regard as unfortunate the fact that such consultation did not obtain in the development of the other amendments to the Mission Plan.

We note, as well, that eight months have passed from May 28 to the presentation of amendments to the Mission Plan. This is more than sufficient time for detailed consultation with the affected parties prior to any formal release of proposed amendments.

I might note that the consulting firm of Creighton & Creighton noted that a spectrum of C & C alternatives exist. Those alternatives range from Tribal and State input only after a decision has been made, to a Tribal and State veto power over Department decisions. Because of the nature of the program, we understand why the latter alternative—a Tribal and State veto power—is not workable. What we do not understand is why the Department insists on allowing Tribal and State input only after it has made its decision.

The Department very rarely amends draft documents in a meaningful way based on public comments. Draft documents circulated for review almost always represent hardened departmental positions which are unlikely to change even in the face of universal Tribal and State opposition. What is necessary is input during the formulation of departmental decisions.

If DOE will not guarantee such input, then Congress must. Oddly, other agencies having Nuclear Waste Policy Act duties such as the NRC have a firmer grasp on this concept than does DOE. A current example is the negotiated rulemaking proposed by NRC to develop changes in the procedural rules relating to license applications.

This procedure guarantees Tribal and State input early in the decisionmaking process. Indeed, the NRC consulted frequently with Tribes and States before proposing a negotiated rulemaking. We find regrettable DOE's inability to learn from NRC's example.

Unless DOE can reshape the attitudes of its personnel at all levels, C & C will remain an unfulfilled promise. Perhaps the appointment of Mr. Kale will have that result. If not, it is incumbent upon the Congress and the Administration to see that whatever is needed for this reshaping takes place.

That concludes my remarks, Mr. Chairman, and I will gladly entertain any questions that you may have.

[The prepared statement of Mr. White follows:]

Testimony of Del T. White

Nez Perce Tribal Executive Committee,

before the

Senate Committee on Energy and Natural Resources

February 4, 1987

INTRODUCTION

Mr. Chairman, members of the Committee, my name is Del T. White. I serve as Chairman of the Nuclear Waste Subcommittee of the Nez Perce Tribal Executive Committee ("NPTEC"). Accompanying me is Ronald T. Halfmoon, Manager of the Tribe's Nuclear Waste Policy Act ("NWPA") program, and Kevin Gover, Special Counsel to the Tribe for NWPA issues. We are pleased to have the opportunity to present the views of the Nez Perce Tribe for the consideration of the Committee.

Mr. Chairman, we believe that the state of the Department's NWPA program is not good. The Department of Energy ("DOE") often seems to go out of its way to create unnecessary problems for itself. If it persists in its current course, DOE's credibility will be beyond rehabilitation. This is peculiarly ironic where, as here, the statute DOE is charged with executing contains extensive provisions designed to enhance the Department's credibility with the public.

The following details our major concerns regarding DOE's execution of the NWPA. We are unable to comment in detail on DOE's proposed amendments to the Mission Plan due to the Department's failure to issue those amendments for review in a more timely manner. We will provide our preliminary assessments of the following:

(1) The provisions regarding the Consultation and Cooperation ("C & C") requirements of the NWPA;

(2) The rationale for the decision to postpone indefinitely site-specific work in the process of selecting a site for the second repository; and

(3) The revised schedule for the characterization of the three first-round sites approved for characterization, and for filing a license application with the Nuclear Regulatory Commission ("NRC") for construction of the first repository.

I. Consultation and Cooperation

The C & C provisions of the NWPA should form the basis for the relationship between affected tribes and states on the one hand and DOE on the other. Had DOE faithfully abided by the letter and spirit of these provisions, its program would not be in the difficulty in which it now finds itself. Because DOE seems unwilling and, perhaps, incapable as an institution of allowing the broad public participation required by the Act, it is under fire from every party with which it must deal in executing the NWPA.

We are most disappointed with the Department's statements regarding C & C in the Mission Plan amendments. The Department proposes few new initiatives, and its report of events is less than complete. We had hoped that the proposed amendments to the Mission Plan would mark a new point of departure for DOE's C & C efforts. What is reflected instead is the Department's continuing inability to comprehend what constitutes meaningful consultation and cooperation.

Nevertheless, C & C remains a central component of the Nez Perce Tribe's NWPA program. As you know, the NWPA is not always clear in its effect or its intent. This is particularly true in connection with the rights of affected Indian tribes under the Act. Our primary reason for focusing on the possibility of C & C negotiations is that we believe such negotiations and any agreement that may result will clarify and ensure the broad tribal rights of participation that Congress intended.

In our efforts to commence C & C negotiations, we have observed the following. First, DOE consistently acts so as to provide the least possible consultation in the process. Second, DOE instinctively, almost convulsively, interprets any amibguity in the NWPA so as to minimize tribal and state rights of participation under the statute.

Two experiences of the Nez Perce Tribe form the basis of our views. Late last summer, the Tribe learned that DOE had "preliminarily dete mined" that the Tribe was ineligible for assistance under Section 118(b) designed to mitigate adverse impacts to tribal interests that may result from the development of a repository at Hanford. Prior to August, the Tribe had been given no indication that the Department doubted the Tribe's eligibility for such assistance.

Although the decision was never made final and never was explained fully, DOE's contract officers enforced the determination in negotiations with the Tribe on FY'87 grant funding. Despite repeated Tribal protests, DOE seemed unwilling to reconsider what had been, after all, only a "preliminary" determination, or even to make that determination final and reduce it to writing.

Finally, on October 17 the Tribe demanded the initation of a process for the final resolution of the issue. The process demanded by the Tribe required consultation with the Tribe at key points in the decision-making process. A draft decision document was prepared by DOE and presented to the Nez Perce Tribe and the Confederated Tribes of the Umatilla Indian Reservation ("Umatilla" or "CTUIR"). Umatilla and Nez Perce prepared a lengthy document in response, demonstrating that the legislative history of the Act supported the tribes' claim of eligibility.

At this point, the process fell into some disarray. The tribes had proposed a step-by-step process involving: (1) the issuance of a document showing DOE's rationale by DOE's Richland Operations Office ("DOE-RL"); (2) a written tribal response; (3) consultation between the tribes and DOE-RL; (4) a written recommendation from DOE-RL to headquarters; (5) a written tribal response; (6) consultation between the tribes and DOE headquarters; and (7) a final written decision from headquarters. After submitting their response to DOE-RL's draft position paper, but before consulting with DOE-RL, the tribes learned that DOE headquarters already had the question under review.

Notwithstanding this breach of the procedure agreed upon, the ultimate result was favorable to the tribes. DOE now has ruled that the tribes are eligible for assistance under Section 118(b). Nevertheless, the entire affair demonstrates the points made above. DOE imposed on the tribes a decision made without consultation, dramatically narrowing tribal rights under the Act. The decision reflected a narrow statutory interpretation apparently designed to limit tribal participation.

On the positive side, the tribes and DOE learned important lessons about consultation and cooperation. True consultation requires tribal input before controversies reach the policy-making level of the Department. It requires that DOE personnel explain their decisions and that the tribes be given an opportunity to respond before the Department's position hardens. It requires direct communication between Tribal and Departmental policy-makers. Finally, it requires that people of good will seek a result that protects the interests of all involved.

These hard-won lessons, however, already are in jeopardy. The tribes recently learned that DOE will determine whether all of the provisions of Section 117(c) apply to the tribes. DOE has not requested tribal input on this matter, and the tribes again have been forced to demand consultation.

These issues of statutory interpretation, unfortunately, have delayed the initiation of C & C negotiations between the Tribe and DOE. The Tribe was most pleased with the disposition of the impact assistance issue. We do have lingering concerns regarding the decision-making process, but believe that the entire affair constitutes the showing of good faith on DOE's part that we deemed a prerequisite to C & C negotiations.

Our satisfaction, however, is tempered by the emergence of the issue concerning Tribal rights of particpation under Section 117(c). DOE announced at a December meeting of the Institutional Socioeconomic Coordinating Group that it was reviewing the question of whether C & C Agreements with affected tribes could include all of the eleven elements listed in Section 117(c). That the Department should now entertain doubts on this issue is made doubly unfortunate by the fact that DOE personnel from both Richland and headquarters had assured the Tribe that each of the eleven items was appropriate to be included in C & C Agreements with affected tribes.

Significantly, Tribal eligibility under each of the eleven areas is one of the several principles NPTEC Chairman Reuben asked Secretary Herrington to acknowledge in the Chairman's letter of December 15 conditionally inviting negotiations. That letter requested Secretary Herrington's acknowledgement of five principles before negotiations will begin. Those principles are as follow:

1. The Tribe has a critical interest in maintaining the environmental integrity of the Columbia River and its tributaries, and Departmental activities at Hanford should be designed to avoid adverse impacts on the river.

2. The Tribe has a critical interest in protecting the natural resources in the Tribe's possessory and usage rights area, and Departmental activities at Hanford should be designed to avoid adverse impacts on those resources.

3. By virtue of its treaties with the United States, the Tribe has prior and paramount reserved rights to certain natural resources,

and the Department is obliged to take all reasonable measures to avoid harm to those resources.

4. As acknowledged in the President's policy statement of January, 1983, a government-to-government relationship exists between the United States and the Tribe, which obligates the United States to protect and enhance the proprietary and governmental rights of the Tribe.

5. The provisions of Section 117(c) do not constitute a limitation of the contents of a C & C Agreement; all issues arising from the NWPA program are open for discussion in C & C negotiations.

Items 1-4 we regard as truisims supported by undeniable facts and two centuries of American jurisprudence. We hope and expect that the Secretary will not find them to be problematic. Item 5, of course, involves the Secion 117(c) issue noted above. If the Department resolves the matter quickly in the Tribe's favor, no impediments will remain to the commencement of C & C negotiations.

The Tribe is gratified that, given an opportunity to provide meaningful input into DOE decision-making, as in the case of the impact assistance issue, the Tribe's views can influence Departmental action. This tells us that DOE is not irremediably hostile, and that there exist within the Department at least a few people who are committed to the principle of broad public participation. We commend those people and urge their superiors to adopt that commitment. At the same time, these events demonstrate that the Department's commitment to consultation and cooperation has not yet reached the point where Department decision-makers routinely seek input from tribes, states and the public before making decisions broadly affecting the course of the program. Until such consultation is universal, relations between DOE and the affected tribes and states will remain essentially adversarial.

A current example of this fact common to all the states and tribes involves the formulation of amendments to the consultation and cooperation sections of the Mission Plan. At the last quarterly meeting of tribes, states and DOE--a meeting held in the wake of the Department's May 28 actions--the Tribe requested that any future proposed amendments to the Mission Plan be formulated in consultation with the tribes and states before their public release. The reaction of DOE headquarters personnel was scornful and the request was rejected out-of-hand. It is self-evident that when individuals at the top levels of the Office of Geologic Repositories and the Office of Civilian Radioactive Waste Management react with scorn to tribal and state input on so important a matter, the commitment of those individuals to consultation and cooperation is absent and their value to the Department--and to the ultimate goal of developing a repository--is doubtful.

Signals indicating the possibility of a change for the better are not evident. Departmental representatives met in November with representatives of the affected parties to discuss proposed amendments to the Mission Plan. While there were many flaws with the timing and format of the meeting, the mere fact that it was held is a positive indication. On the other hand, that this meeting did not result in meaningful proposals to amend the C & C process in the Mission Plan reflects the Department's lack of commitment. It also indicates that those people in the Department who seek improvement in the C & C process are overruled by their superiors when the time comes for true reform. All too often, commitments made by those who work most closely with the tribes are reversed at higher levels of OGR and OCRWM. We can only conclude that these higher levels lack any commitment to carrying out the C & C provisions of the Act.

We also regard as unfortunate the fact that such consultation did not obtain in the development of the other amendments to the Mission Plan. We note as well that eight months passed from May 28 to the presentation of amendments to the Mission Plan--more than sufficient time for detailed consultation with the affected parties prior to formal release of the proposed amendments.

In a report to the nuclear industry on the Department's execution of the C & C provisions of the NWPA, the Consulting firm Creighton & Creighton noted that a spectrum of C & C alternatives exists. Those alternatives range from tribal and state input only after a decision has been made, to a tribal and state veto power over Department decisions. Because of the nature of the program, we understand why the latter alternative--a tribal and state veto power--is not workable, save in the context of a notice of disapproval under Section 116 or 118. What we do not understand is why the Department insists on allowing tribal and state input only after it has made its decision. The Department very rarely amends draft documents in a meaningful way based on public comments. Draft documents circulated for review almost always represent hardened Departmental positions unlikely to change even in the face of universal tribal and state opposition. Such post hoc input is meaningless and, therefore, unacceptable. What is necessary is input during the formulation of Departmental decisions. If DOE will not guarantee such input, then Congress must.

Oddly, other agencies having NWPA duties such as NRC have a firmer grasp on this concept than does DOE. A current example is the negotiated rulemaking proposed by NRC to develop changes in the procedural rules relating to license applications. This procedure guarantees tribal and state input early in the decision-making process. Indeed, NRC consulted frequently with the tribes and states before proposing a negotiated rulemaking. We find regrettable DOE's inability to learn from NRC's example.

Unless DOE can reshape the attitudes of its personnel at all levels, C & C will remain an unfulfilled promise. Perhaps the appointment of Mr. Kale will have that result. If not, it is incumbent upon Congress and the Administration to see that whatever is needed for this reshaping takes place.

II. First Repository Schedule

We believe it is unfortunate that DOE is willing to admit that the first repository schedule is unachievable only after that is an accomplished fact. While we support any change to the schedule allowing more time for the necessary investigations, the schedule proposed by DOE fails to account for the pause in the program that will be necessary for DOE to revisit the entire siting process.

We believe that that process as applied to the first round is flawed fatally and will not result in a licensed repository. All three of the sites approved for characterization are subjects of litigation that the Tribe believes to be meritorious. Confidence in the program is virtually non-existent outside DOE itself. What clearly is needed is a "cooling-off" period during which DOE re-examines the major program decisions made to date. Under no circumstances should DOE be permitted to begin drilling exploratory shafts until a consensus as to the course of the program is reached among the various entities involved to date in the NWPA process.

Only after that consensus exists should DOE begin projecting a schedule for the commencement of construction of a repository. The consensus well may be that DOE must return to an earlier point in the program to re-evaluate the portfolio of sites that should have been investigated.

Such a pause also would allow OGR, OCRWM, and DOE officials carefully to review the personnel in the program for their contribution to the program. Recent disclosures concerning the development of major decision documents make clear the necessity of removing certain individuals from their positions. These people have destroyed the credibility of the program and have ill-served the United States. Individuals lacking commitment to the principles of full disclosure and broad public participation also should be removed.

Any delay in the program caused by this re-evaluation will be more than offset by the benefits of a stable program prooceding towards a resolution of nation's radioactive waste problem. That the program as now conducted is unlikely to result in a licensed repository becomes more evident by the day. Congressional support for the program continues to recede even as tribal, state, and public hostility rises. DOE should not simply wait for the other shoe to drop in the form of court order prohibiting the Department from carrying out its plans. The re-evaluation of the program should begin immediately.

III. Postponement of Work On the Second Repository

The Nez Perce Tribe endorses completely the position of the other affected tribes and states concerning DOE's decision to postpone indefinitely site-specific work on the second repository. In our view, Mr. Chairman, this is not a postponement; it is an abandonment of the second repository program and, therefore, an abandonment of the Congressionally-mandated geographic balance in nuclear waste disposal. Thus, the site chosen for the first repository will be the only repository and will bear the entire burden of what is, after all, a national problem.

The arrogance of this decision is astonishing. While we knew well that DOE was capable of ignoring science and techonology in order to choose Hanford for characterization, the thought that DOE would abandon the second repository program never occurred to us. In so doing, DOE ignored Congress, the affected tribes and states, and, indeed, its own lawyers, who have advised that the statutory schedule cannot be affected by the device of amending the Mission Plan.

The net effect of DOE's May 28 deicisions and its earlier actions on the siting of the Monitored Retrievable Storage ("MRS") facility has been to politicize what was intended to be a technical and scientific process. DOE has succeeded in turning forty-six states against four. We do not genuinely expect Congress to do what needs to be done, as much as we would like it do so.

What DOE has not weighed in its political equation is the possibility that none of its first-round sites will be licensable. NRC's comments on the final Environmental Assessments make clear that the licensing agency has grave reservations about both the sites and the adequacy of DOE's investigation of them. Should the courts agree with the states and tribes that the second-round decision of the selection of sites for characterizaton was illegal, the NWPA program will have failed entirely.

IV. The Recommendation of Hanford for Characterization

Mr. Chairman, we agree completely with the State of Washington, the Yakima Indian Nation, and the Confederated Tribes of the Umatilla Indian Reservation that the selection of Hanford for characterization was unjustified as a scientific matter. Disclosures following the May 28 announcements confirm our belief that the Department's reasons for selecting Hanford were other than scientific.

Most troubling to us are the disclosures by the staffs of the Subcommittees of Messrs. Markey and Weaver. Specifically, we learned from their investigation that certain DOE officials systematically edited from the Multiattribute Utility Analysis ("MUA") findings that the selection of Hanford was unjustifiable. Among the passages found in drafts of the MUA that did not appear in the final document are the following:

(1) There are no realistic assumptions about either preclosure or postclosure expected performance or about the values used to evaluate performance that can result in Hanford being anything but the last ranked site. And the significance of the performance differences between Hanford and all the other sites is substantial.

(2) For all reasonable assumptions and weightings, the Hanford site is ranked last.

(3) Hanford is the least desirable site because its enormously greater costs and greater health effects are not compensated for by its relatively slight advantage in environmental and socio-economic impacts.

We also learned that the Report to the President recommending Hanford for characterization was drafted before the MUA was completed, which explains why the Department set about purging negative references to Hanford in the MUA. For whatever reason, it is clear that Hanford was going to be selected without regard to its technical merit. Indeed, the House investigators demonstrated that DOE "cooked the books" by juggling data, de-emphasizing positive factors in order to justify the selection of Hanford.

In short, the judgments and findings of scientific and technical experts were overruled by policy-makers in the Department. This point is supported by analyses conducted for the National Academy of Sciences and DOE itself by members of the teams that evaluated the selection of sites for characterization.

CONCLUSION

Mr. Chairman, the NWPA process is failing. The current deterioration need not have occurred. While imperfect, the NWPA could have been implemented in a manner leading all concerned to believe in the scientific credibility of the program. Instead, DOE's cynical and self-centered conduct of the program leaves it unlikely to result in a licensed repository.

The Nez Perce Tribe will continue to particpate in the program in good faith and in the hope that DOE will correct its errors and launch a technically-based initiative directed at finding the safest site for the disposal of high-level radioactive waste. We will continue to participate because such participation is necessary to the protection of tribal interests. Recent developments in the relationship between the Tribe and DOE give us some small hope that the Department has begun to see the error of its ways. Much more, will be needed to create the complete confidence in the program that is necessary to ensure that tribal interests will be protected adequately. That confidence cannot emerge without the full, fair, and scientific execution of the NWPA.

Senator Evans. Thank you very much.

Mr. Dick, your entire statement will be entered into the record, and you are free to summarize, if you wish.

STATEMENT OF LOUIE DICK, JR., VICE CHAIRMAN, BOARD OF TRUSTEES, CONFEDERATED TRIBES OF THE UMATILLA INDIAN RESERVATION, AND CHAIRMAN NUCLEAR WASTE ADVISORY COMMITTEES, ACCOMPANIED BY DANIEL HESTER, ESQUIRE, ATTTORNEY

Mr. Dick. Thank you, Mr. Evans, and Mr. Adams.

My name is Louie Dick, Jr. In my country they call me Squayos [phonetic]. I am the Vice Chairman of the Board of Trustees, which is the governing body of the Umatilla Indian Reservation. Unfortunately, I have been in that capacity less than about three or four months, so I am kind of the rookie being sent to the lions.

In addition, I am the Chairman of the Nuclear Waste Advisory Committee, which provides policy guidance to the director and staff of our Umatilla Nuclear Waste Study Program.

I appreciate the opportunity to appear here before you today to testify on behalf of the Tribe concerning the current status of DOE's civilian nuclear waste activities. Accompanying me here today is our attorney, Mr. Daniel Hester.

The Umatilla Tribe is an affected Indian Tribe because of the potential and significant and adverse impact to the Tribe's off-reservation treaty rights if Hanford were selected as a repository. These rights include the right to fish at usual and accustomed stations on the Columbia River and its tributaries, many of which are in the vicinity of the Hanford Reservation; the right to hunt, graze cattle, and gather roots and berries on public lands off the reservation. I should also point out that the Hanford Reservation includes some of our aboriginal lands which we ceded to the United States.

As Vice Chairman of the Umatilla Tribe, I can assure you we will insist that our land and our rights that have survived to this day be fully protected. When the Tribe signed our treaty with the United States Government in 1855, we ceded 6.4 million acres of aboriginal territory to the reservation of 245,000 acres.

Because of the Allotment Act, the size of the reservation was reduced to 145,000 acres in the 1880s. Over half the reservation lands are owned in fee by non-Indians. What little land remains in trust is closely guarded by our people and our government. Equally important to our cultural traditions and economic vitality is the protection of the environment that provides our off-reservation rights to fish for salmon, hunt for deer and elk, graze our cattle, and gather our roots and berries which were used in our sacred ceremonies.

We treasure our land. It is where our ancestors are buried and where our spirits dwell, and where our hopes for our children are based. Therefore, the Umatilla Tribe is an affected Indian Tribe under the NWPA and, as stewards of our land and our resources, have made the oversight of DOE's repository activities at Hanford a high priority. DOE's selection of Hanford for site characterization and the indefinite postponement of the second repository has incited considerable opposition among the Umatilla Tribal members.

These decisions have destroyed Tribal confidence that DOE's implementation of the repository program will be in compliance with the Nuclear Waste Policy Act and the highest technical standards. Tribal members voted overwhelmingly in favor of a resolution opposing a Hanford repository just last month. Today, however, I do not want to spend my time on the site selection process and the second repository postponement.

Our written comments outline our outrage at these decisions, and I am sure that the congressional reports, like the Markey-Weaver report on those decisions have angered you like they have us. I wanted to use this opportunity today to focus on particular problems we are having with DOE.

These problems involve a concern expressed by Congress that DOE has failed to effectively implement the Consultation and Cooperation requirements of the Act. In addition to maintaining a watchful eye on DOE's implementation of the national repository program, the Umatilla Tribe has been engaged in an important and oftentimes frustrating exercise with the DOE defining the level of participation in oversight authority of Congress—Congress' authority intended for affected Tribes in the NWPA.

The Tribe has based its involvement in the repository program on the view that our designation as an affected Tribe authorizes us to participate on an equal basis with the affected States. It is clear that Congress intended the Consultation and Cooperation, or the C & C agreement to resolve these issues, and for that reason the Tribe attended C & C negotiations in July of 1985.

The principal concern of the Tribe was to ensure that the agreement recognized the treaty rights of the Tribe, and that the Tribe had the authority to protect and preserve those rights throughout the repository program. DOE's revision of the Mission Plan released last week is correct in claiming there have been six C & C negotiation sessions with the Umatilla Tribe in the last 18 months. DOE failed to mention, however, that the Umatilla Tribe terminated negotiations on January 1987 because of the DOE's failure to recognize the role Congress intended affected Tribes to play in the repository program.

During the C & C negotiations of 1986, two issues arose that highlighted the difference that Tribes were having with DOE. Both issues required interpretation of unclear provisions in the NWPA regarding the rights of affected Tribes.

The first dispute arose over the entitlement of affected Tribes to file an impact report and receive impact assistance under section 118(b) of the Act. The impact report was intended to provide an affected party an opportunity to identify impacts that a repository would cause, and the impact assistance was designed for the mitigation or compensation of those impacts.

The dispute over the impact assistance issue stemmed from ambiguities of section 118(b)(3). That section appears to be contradictory on the eligibility of the affected Tribes who do not host a repository to receive the impact assistance. One section says all affected Tribes are entitled to impact assistance, while another seems to limit the assistance to Tribes who host a repository.

To resolve the ambiguity, we insisted, and the DOE agreed, that the affected Tribes would be consulted prior to DOE's decision. In

October we received a DOE preliminary position paper on the impact assistance. As expected, the DOE claimed we were not entitled to it. The consultation process on this basis was abysmal. DOE's preliminary position paper was superficial and made no attempts to analyze the legislative history of the Act to discern the intent of Congress.

We sent a letter requesting a legal and policy basis for DOE's position in November, and never received a response. We set up a meeting with DOE-Richland, which we cancelled when we found out at the last minute their chief policymaker would not be able to attend the meeting.

Because of our inability to engage DOE-Richland's officials in that instant discussion on the issue, we decided to take our case to DOE headquarters. In the meanwhile, a second dispute arose that went to the heart of the consultation agreements between DOE and the affected Tribes. It involved an interpretation of section 117(c) which lists the procedure Congress felt that a C & C agreement should include. While States and Tribes are expressly mentioned in most procedures, Tribes were omitted in several of them.

In our C & C negotiation, we took the position that it made no sense to preclude Tribal involvement in any of the procedures. DOE officials initially agreed with our position. At our July 9 C & C negotiation at DOE headquarters, a representative on their negotiation team stated it was "obvious that Congress intended that section to apply equally to Tribes as well as States."

However, in a meeting last December DOE backed away from their previous claims and said they needed to formulate their policy on the issue. Because of DOE's handling of the impact assistance issue and their consistently narrow interpretation of the Tribe's right under the NWPA, the Umatilla Tribe formally cancelled future C & C negotiations on January 5. Since our cancellation of negotiations, DOE has reversed itself and we have been informed affected Tribes are entitled to draft an impact report and receive impact assistance.

While we are encouraged by this decision, DOE's poor consultation on this basic issue is disturbing. The future of C & C negotiations with the Umatilla Tribe is in doubt. We must await DOE's decision on the interpretation of section 117(c) before we decide whether we will return to the negotiating table.

In deliberating on the NWPA, Congress struggled with the need for a safe disposal of nuclear waste, and anticipated opposition to such a disposal facility by local residents and their State or Tribal government. In the hopes of avoiding this conflict, Congress crafted an important oversight role for affected States and Tribes. Congress felt that the participation of the affected parties in the repository program would promote public confidence in the safety of nuclear waste disposal.

The Consultation and Cooperation requirements were designed to ensure DOE's response to local concerns that it met its statutory and regulatory obligations. Adherence to this process, it was hoped, would result in a site selection methodology for two repositories that were technically sound and, therefore, credible. The integrity and credibility of the site selection and characterization process would then result in repositories that were safe and, if not embraced by affected governments, would at least be acceptable.

All has not gone as planned, and DOE is largely to blame. The selection of sites for characterization for the first repository, especially at Hanford, sacrificed both the technical merit and the credibility of the Department's site selection decisions. The second repository postponement indicated that DOE is more responsive to political pressure than their obligations under the NWPA.

Finally, DOE's poor performance in consulting with us on resolving even fundamental issues on the level of our participation in the repository program strongly suggests that we will be unable to resolve the more difficult issues we expect in the future. The Umatilla Tribe feels it is time for the Congress to re-examine the NWPA and DOE's role in the repository program.

In my country, we would say "Waoka Kalou" [phonetic], that is all.

Thank you, Mr. Evans.

[The prepared statement of Mr. Dick follows:]

TESTIMONY
OF
LOUIE DICK, JR.
VICE CHAIRMAN
CONFEDERATED TRIBES OF THE
UMATILLA INDIAN RESERVATION
BEFORE THE SENATE COMMITTEE
ON
ENERGY AND NATURAL RESOURCES

FEBRUARY 4, 1987

I. Introduction.

Chairman Johnston, members of the Energy and Natural Resources Committee, my name is Louie Dick, Jr. I am the Vice Chairman of the Board of Trustees which is the governing body of the Confederated Tribes of the Umatilla Indian Reservation. In addition, I am Chairman of the Nuclear Waste Advisory Committee which provides policy guidance to the director and staff of our Umatilla Nuclear Waste Study Program. I appreciate the opportunity to appear before you today to testify on behalf of the Tribe concerning the current status of DOE's civilian nuclear waste activities. Accompanying me here today is our attorney, Mr. Daniel Hester.

The Umatilla Tribe has been an active participant in the process to site the first nuclear waste repository mandated by the Nuclear Waste Policy Act (NWPA) since 1983. In that year the Tribe petitioned and received from the Department of the Interior certification of its status as an "affected Indian tribe" because of the potential for significant and adverse impacts to the Tribe's off-reservation treaty rights if Hanford were selected as a repository. These rights include the right to fish at usual and accustomed stations on the Columbia River and its tributaries, many of which are in the vicinity of the Hanford Reservation, and the right to hunt, graze cattle, and gather roots and berries on public lands off the reservation. I should also point out that the Hanford Reservation includes some of our aboriginal lands that we ceded to the United States.

The governing body of the Umatilla Tribe, the Board of

Trustees, has the authority under our constitution to exercise and protect all existing and future Tribal rights arising from the Tribe's treaty, federal law and other sources. Of paramount importance to the Tribe is the protection of its reservation homeland and the Tribe's off-reservation treaty rights. The Umatilla Tribe is gravely concerned that a Hanford repository will impair or destroy the physical resources reserved by the Tribe in our treaty and promised to the the Tribe in perpetuity by the United States Govenment. This concern stems from the location of the Hanford site on the Columbia River and from the fact that the primary rail and highway routes to Hanford pass through the center of the Umatilla Reservation.

As Vice Chairman of the Umatilla Tribe, I can assure you we are adamant in our demand that our land and our rights that have survived to this day be fully protected. When the Tribe signed our treaty with the United States Government in 1855, we ceded 6.4 million acres of aboriginal territory for a reservation of 245,000 acres. Because of the Allotment Act the size of the reservation was reduced to 145,000 acres in the 1880's. Over half of the reservation lands are owned in fee by non-Indians. What little land remains in trust is closely guarded by our people and our government. Equally important to our cultural traditions and economic vitality is the protection of the environment that provides our off-reservation rights to fish for salmon, hunt deer and elk, graze our cattle and gather the roots and berries which are used in our sacred ceremonies. We treasure our land; it is where our ancestors are buried, where our spirits dwell and where our hopes for our children are based. Therefore, the Umatilla Tribe, as an "affected Indian tribe" under the NWPA and as stewards of our land and resources, have made the oversight of DOE's repository activities at Hanford a high priority.

The Umatilla Tribe commends this Committee for holding these hearings on the status of the nuclear waste repository program. It has become abundantly clear that DOE implementation of its responsibilities under the NWPA has doomed the development of public confidence in the technical integrity of the repository program. Furthermore, DOE has frustrated the consultation and cooperation process that was designed to resolve differences with affected parties. This process was at the center of Congressional concern when the role of affected states and Indian tribes was crafted. From our perspective, the performance of DOE in the repository program is in need of continued Congressional scrutiny, as well as the oversight of affected states and tribes, to insure that DOE implements the NWPA as Congress intended.

II. DOE's May 28, 1986 Decisions.

A. Selection of Hanford for Site Characterization.

DOE's decisions of May 28, 1986 destroyed any confidence the Umatilla Tribe had in the integrity of DOE's implementation of the repository program. Hanford should not have been selected to undergo site characterization. We read with disbelief the Recommendation Report which cited Hanford's fifth place ranking in the multiattribute utility analysis but nonetheless recommended Hanford as one of the three sites to be characterized.

The Markey-Weaver Report released in October confirmed the Tribe's fears about the DOE site selection process. The Report demonstrated DOE knew which sites it wanted to characterize and eliminated or manipulated data to reach its predetermined result. DOE drafted the Recommendation Report selecting Hanford prior to completing the Methodology Report that was supposed to provide the "decision-aiding" data DOE needed to recommend the sites to undergo characterization.

Moreover, DOE systematically removed from the Methodology Report references to the poor ranking of the Hanford site. One such reference found in an early draft of the Methodology Report stated as follows:

> Although the weights of k[preclosure] and k [postclosure] at which the ranking of the sites changes depending on whether base-case, pessimistic, or optimistic assumptions are adopted, certain patterns are clear and stable under a wide range of assumptions. Most significantly, the Hanford site is in all cases ranked last (i.e., has the lowest composite utility), regardless of the relative weight assigned to preclosure and postclosure. This is so because it is ranked last for all sets of assumptions in both preclosure and postclosure (i.e., it sucks).

For obvious reasons, DOE removed this passage from the final Report.

B. "Indefinite Postponement" of Second Repository Site Selection.

DOE's announcement that it was terminating its efforts to identify sites for the second repository was equally disturbing to the Tribe. The decision represents a blatent violation of the letter of the NWPA and of the sensitive political compromise that resulted in the passage of the NWPA. DOE's claims that their decision was premised on projections of reduced waste volume and concern for the federal treasury were at the very least deceptive. The Congressional inquiries into DOE's memos relevant to the second repository postponement confirmed what we already suspected, that political expediency was the primary factor motivating DOE's decision to disregard the timetable for identifying second repository sites required by Congress in the NWPA. The Tribe shares in the assessment of DOE's General Counsel, and that of the General Accounting Office, that DOE's plan to effectuate the postponement of the second repository program by amending the Mission Plan is legally insufficient.

DOE's implementation of the repository program has incited a national uproar and dozens of legal challenges. The selection of Hanford for characterization has caused a strong political response as well. The public confidence in the safety of radioactive waste disposal that Congress felt essential when the NWPA was passed has been compromised by DOE. The Tribe's general membership voted overwhelmingly to condemn the selection of Hanford for characterization just last month. Residents of the State of Washington voted overwhelmingly in favor of Referendum 40 which requires state officials to continue their challenge to DOE's selection of Hanford. Oregon Governor, Neil Goldschmidt, recently announced his determination to give Oregon voters a similar opportunity. There was little question that the selection of sites for further study as a nuclear waste repository would be met with some political and legal opposition. But DOE has severely jeopardized the prospects of the repository program surviving the political or legal turmoil it has churned up because of its failure to make decisions concerning the first and second repository programs based on firm legal and technical grounds rather than on political or programmatic expediency.

III. Consultation and Cooperation Agreement Negotiations Issues.

A. Function of a C and C Agreement.

In addition to maintaining a watchful eye on DOE's implementation of the national repository program and BWIP activities at Hanford, the Umatilla Tribe has been engaged in an important and often times frustrating exercise with DOE defining the level of participation and oversight authority Congress intended for affected Indian tribes in the NWPA. The Tribe has premised its involvement in the repository program on the view that our designation as an affected tribe authorizes us to participate on an equal basis with the affected states. It is clear that Congress intended the Consultation and Cooperation (C and C) Agreement to resolve these issues and for that reason the Tribe initiated C and C negotiations in July 1985. The principal concern of the Tribe was to ensure that the agreement recognized the treaty rights of the Tribe and that the Tribe had the authority to protect and preserve those rights throughout the repository program. In order to fully protect its treaty rights, the Tribe recognized it was critical that it take full advantage of the oversight role Congress legislated for affected Indian tribes in the NWPA. The Tribe feels that Congress designed the C and C Agreement to require DOE to recognize in writing the interests and concerns of each affected party, their oversight authority and the procedures for responding to the concerns and impacts identified by affected parties.

In early meetings with the DOE C and C negotiating team, Tribal representatives specifically stated they expected a negotiated agreement to result from a broad reading of the NWPA and one that recognized that the provisions of Section 117(c) set the floor for possible elements of a C and C Agreement, not the ceiling. The Tribe's claim that the NWPA should be interpreted liberally when ambiguities arose concerning the authority of affected tribes is in accord with the Ninth Circuit decision in State of Nevada ex rel. Loux v. Herrington, 777 F.2d 529 (9th Cir. 1985). In rendering its decision allowing Nevada to conduct independent tests prior to their site being selected for characterization, the court relied upon the legislative history of the Senate predecsssor bill to the NWPA which stated that affected parties "should be entitled to the broadest possible rights and opportunities to participate in the development of the [nuclear waste] facilities..." The court also determined that the general purposes of the NWPA and the independent oversight authority conferred on affected parties by Congress indicated a liberal interpretation of the Act was appropriate. We have met considerable resistance from DOE in seeking to apply the interpretive rules from the Nevada case in our C and C negotiations.

During C and C negotiations in 1986, two issues arose that high light the difficulties the Tribe is having with DOE. Both issues require an interpretation of ambiguous provisions in the NWPA regarding the rights of affected tribes. In addition, both issues involve two equally important elements: first, the substance of the DOE decision, and second, the effectiveness of the consultation process by which the decision was reached.

B. Entitlement to Impact Assistance.

The first dispute arose over impact assistance. At a meeting of the Tribe and DOE C and C negotiators in August 1986, we were informed that the DOE Richland Project Office had made a "preliminary determination" that the affected Indian tribes were not entitled to file an impact report or receive impact mitigation assistance under Section 118(b)(3) of the NWPA. The impact report was intended to provide an affected party an opportunity to identify impacts that a repository would cause and the impact assistance was designed for the mitigation or compensation of those impacts. DOE officials promised they would not render a final decision on this issue until the affected tribes were provided an opportunity to review and comment upon the draft position paper from the Richland office. After considerable delay in issuing the draft document, the Tribe finally received the position paper at the end of October.

The dispute over the impact assistance issue stemmed from ambiguity in Section 118(b)(3). That section appears contradictory on the eligibility of affected tribes who do not host a repository to receive impact assistance. Section 118(b)(3)(A) requires DOE to provide "financial and technical assistance to any affected Indian tribe requesting such assistance and where there is a site with respect to which the Commission has authorized construction of a repository." DOE initially ignored this language and only cited subsection (B) which states that an affected tribe desiring impact assistance shall prepare a report to DOE "on any economic, social public health and safety, and environmental impacts that are likely as a result of the development of a repository at a site on the reservation or such Indian tribe." (Emphasis added.) Because of the ambiguity, both sides agreed there was a need to research the legislative history of the NWPA to discern the intent of Congress. The draft DOE position paper on this issue shed little light on the legal basis for DOE's conclusion that affected tribes were not entitled to impact assistance. On November 5, 1986 our attorney sent a letter to DOE's General Counsel in Richland requesting citations to the NWPA and its legislative history which supported DOE's position. This information was requested on behalf of the Umatilla and the Nez Perce Tribes who were in the process of jointly preparing a response to DOE's position paper. The Tribe never received any additional information from DOE on the legal basis of DOE's preliminary position paper.

A meeting was scheduled in December 1986 to discuss the impact assistance issue with the top echelon of DOE Richland officials. The Umatilla and Nez Perce Tribes sent a Memorandum of Law to DOE in response to the DOE position paper on November 24, 1986. This memorandum clearly demonstrated that Congress did not intend impact assistance to go only to "host" affected Indian tribes, but to all affected Indian tribes as defined by the NWPA. The memorandum included close scrutiny of the legislative history of the Act which documents Congress' view that all affected Indian tribes were authorized to participate in the repository program on an equal basis with states. The memorandum concluded that DOE must interpret the ambiguities concerning affected tribe entitlement to impact assistance consistent with the clear expression of Congressional intent found in the legislative history.

The meeting to discuss the dispute over impact assistance was called so that the appropriate policy making officials from all interested parties could seek to resolve the issue. John Anttonen, the Assistant Manager for Commercial Nuclear Waste at Hanford, was supposed to be DOE Richland's chief representative. The meeting date was changed to accomodate Mr. Anttonen's schedule once. Later, just prior to the meeting, the Tribe learned Mr. Anttonen would not attend the meeting rescheduled for December 18, 1986. We determined, as did the Nez Perce Tribe, that the meeting should be cancelled as the purpose of the meeting could not be achieved in Mr. Anttonen's absence. Because of the ineffective consultation with the DOE Richland office, we decided to take our case for impact assistance to DOE headquarters where we were told the final agency decision would be made.

C. Interpretation of Section 117(c).

In the meantime, we learned of what is potentially a DOE policy change with grave implications for C and C agreements with affected tribes. Section 117(c) lists the issues Congress felt a C and C Agreement should address. However, while most provisions in that section expressly apply to states and tribes, several provisions omit reference to tribes. See Section 117(c)(5-8). In our C and C negotiations, we took the position that it made no sense to preclude tribal involvement in those subsections where tribes were omitted.

DOE initially agreed with our position. At the Institutional/Socioeconomic Coordinating Group (ISCG) meeting between DOE and affected parties held in St. Louis in June 1986, Barry Gale, from DOE Headquarters and Chairman of the ISCG, declared it was DOE policy that all subsections of Section 117(c) applied equally to states and tribes. At our C and C negotiations on July 9, 1986, Mr. Gale, who represents DOE Headquarters in the negotiations, repeated the DOE policy claiming that it was "obvious that Congress intended that section to apply equally to tribes as well as states."

Nonetheless, at the last ISCG meeting in December 1986, DOE was uncertain about the application of Section 117(c) provisions to affected tribes and the issue was made an action item for subsequent DOE resolution. We view DOE's recent uncertainty on the applicability of Section 117(c) as a failure by DOE to live up to prior policy pronouncements and to commitments DOE negotiators have expressly made in our C and C negotiations. More importantly, this is potentially another DOE interpretation of the NWPA that would have the effect of further curtailing the role of affected Indian tribes. The Tribe has sent a letter to Ben Rusche demanding that the Tribe be consulted prior to a DOE decision on this issue.

D. Status of C and C Negotiations.

On January 5, 1987 we notified DOE we were cancelling future C and C negotiations. The decision was based on the Tribe's displeasure with DOE's handling of the impact assistance issue, DOE's consistently narrow interpretation of the Tribe's rights under the NWPA and because of lingering issues related to our as yet unresolved 1987 budget. Following our decision, the DOE Richland office, without any consultation with the Umatilla Tribe, unexpectedly reversed itself and announced the final DOE decision that all affected Indian tribes are eligible to prepare and file an impact report and receive impact assistance. We were informed of this decision on January 22, 1987.

The Tribe has engaged in C and C negotiations with diligence and in good faith. The Tribe preceives a C and C Agreement as a document that breathes life into the NWPA and defines the independent oversight role Congress envisioned for affected Indian tribes. The Tribe also views a C and C Agreement as establishing a procedure whereby the Tribe can protect the rights reserved for them in their Treaty of 1855 with the United States Government. When the Congress passed the continuing resolution providing for DOE's FY'87 budget for NWPA activities, $79 million was withheld pending DOE certification to Congress that it has made a good faith effort to comply with the consultation and cooperation requirments of Section 117(c) of the NWPA. The Umatilla Tribe suggests that Congress closely monitor the resolution of C and C issues between the Tribe and DOE to assist you in your deliberations concerning DOE's Section 117(c) efforts.

Clearly the DOE decision on impact assistance is an important first step in recognizing the authority of affected Indian tribes. We are encouraged by the DOE decision on this issue, but we are very concerned about the abysmal process that yielded the result. As we pointed out to DOE on several occasions, the importance of the impact assistance issue went beyond the substance of the eventual decision. Also at stake was the development of a process in which conflicts between DOE and the Umatilla Tribe could be resolved. The consultation process did not develop much, if at all, in the resolution of the impact assistance issue. DOE's dedication to improving the consultation requirements of the NWPA, and continued Congressional pressure on the Department, will be necessary to effectively develop the relationships Congress envisioned for affected Indian tribes and DOE during the repository program.

The Tribe has withdrawn from C and C negotiations for the time being because of DOE actions which we perceived as restrictive of the level of tribal participation in overseeing DOE activity and which would limit our ability to protect our treaty rights. We have repeatedly demonstrated our willingness to negotiate with DOE for a C and C Agreement that defines the relationship between the Tribe and DOE that Congress intended.

We have stated to DOE our refusal to continue negotiations if DOE negotiators are going to consistently read the NWPA to narrowly construe the authority of the Tribe so as to inhibit our ability to protect our interests. With the impact assistance decision rendered in our favor, we must now await DOE's decision on the interpretation of Section 117(c) to determine whether we will return to the table for C and C negotiations.

IV Conclusion.

While deliberating on the NWPA Congress struggled with the need for the safe disposal of nuclear wastes and the anticipated opposition to such a disposal facility by local residents and their state or tribal governments. In the hopes of avoiding this conflict, Congress crafted an important oversight role for affected states and tribes. Congress felt the participation of these affected parties in the repository program would promote public confidence in the safety of nuclear waste disposal. The consultation and cooperation requirements were designed to insure DOE responded to local concerns and met its statutory and regulatory obligations. Adherence to this process, it was hoped, would result in a site selection methodology for two repositories that was technically sound and, therefore, credible. The integrity and credibility of the site selection and characterization process would then result in repositories that were safe and, if not embraced by affected governments, would at least be acceptable.

All has not gone as planned and DOE is largely to blame. The selection of sites for characterization for the first repository, especially Hanford, sacrificed both the technical merit and the credibility of the Department's site selection decisions. The second repository postponement indicates that DOE is more responsive to political pressure than their obligations under the NWPA. Finally, DOE's poor performance in consulting with us in resolving even fundamental issues on the level of our participation in the repository program strongly suggests that we will be unable to resolve the more difficult issues we expect in the future. The Umatilla Tribe feels its time for the Congress to reexamine the NWPA and DOE's role in the repository program.

Senator Evans: Thank you, very much.

I think in each of your prepared testimonies you have responded really quite well to the question that I asked of the preceding panel: the response of the Department to the requirements of section 117 of the Act, particularly those requirements as they related to good-faith efforts on the Department's part to negotiate and sign Consultation and Cooperation Agreements.

Let me, however, ask in each case if you feel that there is further detailing or chronology that you would like to submit for the record that would list the attempts that have been made, the reaction, the timeliness, and the completeness of the Department's reaction to those requests? I think we have gotten a good deal of information from your testimony, but I would appreciate any further chronology that you would care to submit for the record. Or, if any of you have any further comments at this time on that relationship.

Did you feel, for instance, that the Department in responding to section 117(c)—and let me try to get to the wording of it—where it says, on written agreements, that "The Secretary shall seek to enter into a binding written agreement and shall begin negotiations with such State and, where appropriate, to enter into a separate binding agreement with the governing body of any affected Indian Tribe," and it sets forth the procedures and the requirements.

Now what would your understanding be of "where appropriate to enter into a separate binding agreement with the governing body of any affected Indian Tribe"? What is your understanding of the attitude of the Department as to those words? How have they reacted, and any contrast there is in your understanding between how they deal with States and how they have dealt with the affected Tribes.

Mr. Sampson?

Mr. SAMPSON. Yes. Mel Sampson, from Yakima.

The Yakima Tribe received the same or comparable letter that the State or States received. Therefore, I would have to presume that in response to that, that must be an expression of being "appropriate."

So we are in the—some, a little over a month ago, have initiated the process of developing, draft as it may be, our position, or our conceivably thoughts on a proposed agreement. But until—I do not see it becoming an acceptable negotiated agreement, as it may be, until those fears and concerns that we have from the standpoint of Energy is going to be resolved or become more acceptable, at least to a level that is going to make us comfortable.

Senator EVANS Have they provided any money for you to carry out some of your responsibilities and capability to do your independent analysis?

Mr. SAMPSON. We have been the recipient of a grant, pursuant to the Act, so in reference to that, yes, we have. But I might, while I am on that subject, somebody had asked earlier, I believe you did, in reference to the kinds of response or cooperation we are having in carrying out that MIR activity of the consultation portion of it, as far as we perceive it, we have experienced on numerous occasions, and still are experiencing, and I will allude briefly to some of those.

Also, in response to your question, we will submit to you a compilation of being more discrete in listing those particulars as far as the problems that we are having on a timely basis, and on an adequate basis, receiving information that we have requested.

[The information requested appears in the appendix.]

Mr. SAMPSON. Now I will just list maybe four, or refer to maybe four areas for examples I would like to give you examples of.

One of them would be that the primary DOE study assessing the archeological resources at Hanford was not included in the references for the draft Hanford Environmental Assessment. They have not yet, as of this day, provided us with that resource of information, of which we have requested.

Senator EVANS. You have requested that from them?

Mr. SAMPSON. Right. And on repeated occasions, we have requested—and as it pertains to Hanford it is pertinent—hydrology data that takes up to six months to get it. In some cases, what you receive it becomes opinionistic then, but it is not adequate based on what our request was.

The same thing applies with the environmental monitoring plans that we requested. We do maybe in some cases get a response back, but it is insufficient, at least from our standpoint when we consult with our experts.

Senator EVANS. You understand that in those cases they are not sharing with you all of the information that they are receiving?

Mr. SAMPSON. Yes, it contributes to the doubt that we had earlier in our testimony. So in our opinion, yes.

Then also in reference to the socioeconomic plans that they are proposing, we requested that and have not received it in detail that is acceptable to us, which we want to at least make a major emphasis from the standpoint of the socio impact it is going to generate, it being only 13 miles from us. If you are going to have a neighbor, you want to know what they are doing.

But if we have a choice, we do not want them as a neighbor.

Senator EVANS. Do I understand correctly that in a general sense that during the latter part of 1986 the Department was not responsive, and in fact, was unwilling to reach out, and then suddenly shifted gears in early 1987. Then it offered both money and the opportunity to meet; and at that point, you decided "once bitten, twice warned," that maybe you cannot re-enter negotiations until there is sufficient feeling that there is some opportunity to make progress? Is that essentially what has happened?

Mr. SAMPSON. That is true.

Senator EVANS. How about Mr. Dick? Has that been essentially as I understand it the relationship with your Tribe, as well?

Mr. DICK. Yes. I would like to say that we would like to submit additional information.

Mr. DICK. I will let Dan Hester answer that.

Senator EVANS. All right. Yes. Would you identify yourself for the record, please.

Mr. HESTER. Yes, Mr. Senator. My name is Dan Hester. I am the attorney for the Tribe on Nuclear Waste Policy Act issues.

The answer to your question about any change in the Department's policy concerning Consultation and Cooperation, we did not wait for the Department of Energy to approach the Tribe to enter C & C negotiations. In fact, as Mr. Dick has pointed out, we approached the Department back in July of 1985 to initiate negotiations ourselves because we thought there were ambiguities in the Act that we could straighten out through negotiations.

We have not seen any increase in our funding to conduct C & C negotiations in the last couple of months. However, while the impact assistance issue has been lingering now for some eight or nine months, it is perhaps not just fortuitous that that answer came in the last couple of weeks in favor of the Tribes, because I think the Department recognized that the one party, the one affected party that was involved in C & C negotiations would get out of those negotiations if they did not favorably decide that issue for the Tribe, and another Tribe that was thinking about getting involved in the negotiations was making the same kind of statements to the Department.

Senator EVANS. From the time you initiated those contacts, which I guess were what in early 1985, you say?

Mr. HESTER. In the summer.

Senator EVANS. In the summer of 1985, how quickly did you get any reaction from the Department? What was the nature of that reaction? Sort of what occurred, then, between that request of yours in the summer of 1985 and the end of 1986?

Mr. HESTER. Well, there was no delay in the Department's response to our request to initiate negotiations. I think the area that has caused more of a problem has been the quickness with which we have been able to resolve issues.

As Mr. Dick has pointed out, we have had six negotiation sessions in the last 18 months, and I can assure you that we have not moved out of the recitals provisions of our proposed C & C agreement. We came to the negotiating table with a 35-page suggested working paper, and we have not been able to move beyond what I think are very fundamental issues like what is the Trust relationship that exists between the Federal Government and the Umatilla Tribe? And what obligations does that obligation impose?

Senator EVANS. Are they attempting to review that question of what the Trust relationship is between the Tribes as an element of these negotiation?

Mr. HESTER. Well, Senator, in our negotiations we could not even—it did not appear to interest them in even doing that. We had one negotiations session—and by the way, all of this is on transcripts—but there was a provision in our C & C agreement in the recitals section that mentioned the Trust relationship between the Federal Government and the Umatilla Tribe, and the fact that those obligations fell upon the Department of Energy as a Federal agency.

And there was no response from the Department's negotiators as to those provisions. So we went on to another provision, assuming of course that their silence could be construed as acquiescence.

One of our negotiators said, well, let us go back to that Trust relationship. Could you tell us what that means? And the chief negotiator for the Department looked at the lawyer and said, well, maybe you would like to answer that. And he said, well, I am not really able to do that right now. So they thought they would go back and study the issue.

The negotiations, I think it is safe to say, have involved a fair amount of education of the Department as to what the Treaty rights of the Tribes are, what the Trust obligations of the Department are to the Tribe, and what the implications of the President's Government-to-Government Indian Policy Statement of 1983 are.

I do not think we have gotten much beyond that point. Certainly technical issues about the various technical areas that the Tribe would like to review have not been even touched at this point.

Senator EVANS. Mr. White, do you have any further comments on this relationship?

Mr. WHITE. Well, I think Mr. Hester has kind of reiterated, or said what I would like to say and I do not want to go over what he said, but I would like to point out that dealing with DOE has been an experience and a half. I do not think I have to tell anybody that.

But one thing that we find out is that we come to the point, the main point, the sore point I guess with Tribes is dealing with Federal agencies. It more or less comes to us, and every time we sit down at a table, we are always explaining various things that seem to me to be sophomoric questions that should not be questioned, but that is a process we have been having all through this affected-Tribe status with the Nuclear Waste Policy Act.

That is why we always testify, because we want to let them know what Tribes are all about. That is what my testimony was about today. One of the points was about the Government-to-Government relationship. It is pretty hard to comprehend if you are not involved in that area. If you say it to anybody off the street, it is just completely off-base with them and they will not be able to answer that.

Senator EVANS. Sure.

Mr. WHITE. But the whole thing that we find out is, I guess like any agency that really has a tough time with all these entities involved, I guess when it comes to Tribes there are distinct things that they have to be concerned with when they talk with an entity such as a Tribe. That is the part where our standards and our morals and everything that we do is maybe a little different than what they expect, and that is where we come in. We are always sitting there explaining, and to us it is more of an education process.

Senator EVANS. Senator Adams?

Senator ADAMS. Thank you, Senator Evans.

I think you have covered most of the points in which I had an interest. I just had two follow-on questions from Mr. Dick's testimony.

To Mr. Sampson and Mr. White, did you ever arrive at a point in your negotiations where they discussed the transportation of these materials through the reservation areas? Did you ever get to that point with them? Did they raise it?

Mr. SAMPSON. No. We have not, not with the Department; but the Yakima Tribe has taken a position of restricting, or eliminating, or disallowing nuclear hazardous waste transportation through the reservation. I might just follow up, we have not probably to the extent we would like at this point finalized the manner in which we can consistently monitor that at this point.

Mr. White. Just to comment on that transportation, I think the Nez Perce Tribe is in a position where that is one of our major concerns, the transportation issue, going through Hanford. Plus, under what they call Interstate US-12 that traverses our Reservation on the northern portion about 70 miles through our Reservation, and it is on the tributary that is affected by the Columbia River Chain and tributaries.

So we are quite concerned because a few years back they had an accident, but it was what they call low-level, so it was not really a major concern according to the writeup in the various news media, but we are concerned. It does not matter what kind of level or intensity of radioactive waste, we are concerned about that very much. Especially with high-level, we are greatly concerned.

Senator Adams. Have you passed any sort of regulation or resolution similar to that that has been passed by the Yakima?

Mr. White. No, not at this point we have not.

Senator Adams. Have you discussed this with the Department of Energy when you had your original preliminary discussions with them?

Mr. White. I am pretty sure that has been brought out.

Senator Adams. And did they give you any reply or position as to how they were going to handle this?

Mr. White. Not as of yet.

Senator Adams. Senator, I want to thank all of you very much for your cooperation, and for your statements. I think they indicate the degree of the problem.

Thank you. I have no further questions.

Senator Evans. Thank you very much. To all members of the panel, let me announce that this hearing will continue tomorrow morning at 9:30 a.m., and the only panelist will be the Honorable Ben Rusche, who is the Director of the Office of Civilian Radioactive Waste Management.

With that, this hearing is adjourned.

[Whereupon, at 12:57 p.m., the hearing was recessed, to reconvene Thursday, February 5, 1987.]

NUCLEAR WASTE PROGRAM

THURSDAY, FEBRUARY 5, 1987

U.S. SENATE,
COMMITTEE ON ENERGY AND NATURAL RESOURCES,
Washington, DC.

The committee met, pursuant to notice, at 9:40 a.m., in room SD-366, Dirksen Senate Office Building, Hon. J. Bennett Johnston, chairman, presiding.

OPENING STATEMENT OF HON. J. BENNETT JOHNSTON, A U.S. SENATOR FROM THE STATE OF LOUISIANA

The Chairman. The Committee will come to order. Today, the Committee is holding the third in a series of hearings on the implementation of the Nuclear Waste Policy Act of 1982.

At this hearing, we will hear from Ben Rusche, who is the Director of the Department's Office of Civilian Radioactive Waste Management.

Mr. Rusche, I hope you will begin by giving the Senators and those in attendance, as well as those who might be watching on CSPAN or television, a description of nuclear waste, what is involved, how dangerous it is, what the difficulties are in the management of it, of transportation of it. In other words, what are the dangers to a State?

I ask that question, because I do not think there is a subject about which there is such tremendous lack of knowledge as there is of the question of nuclear waste. I mean, people basically don't know whether it is solid, liquid, gaseous; whether it can flow, whether it can explode; if it leaks out, can it poison you? What are the properties and characteristics of nuclear waste? What are the dangers of it? How long do the different types of dangers last? The gamma rays, the alphas and betas, and how do the alpha and beta rays differ from the gamma rays?

Give us, if you will, to start out, a primer on nuclear waste, which I think is not really all that hard to understand if you just lay it out in a simple way for us. And then I know you will want to answer all those things that have been said in these last couple of days.

I frankly think there is not an answer to some of them, like why you have not proceeded with the second repository. Nevertheless, I know you will want to attempt to do that.

In any event, if you will begin with that description of nuclear waste.

[The prepared statement of Senator Johnston follows:]

STATEMENT OF SENATOR J. BENNETT JOHNSTON

Chairman, Committee on Energy and Natural Resources

Hearing on Civilian Nuclear Waste Management
February 5, 1987

Today the Committee is holding the third in a series of hearings on the implementation of the Nuclear Waste Policy Act of 1982 by the Department of Energy. At this hearing we will hear Ben Rusche, the Director of the Department's Office of Civilian Radioactive Waste Management.

Yesterday the States and Tribes directly affected by DOE's selection of sites for characterization provided the Committee with a long list of complaints about the implementation of the program. No one said that the Act itself is flawed, perhaps because our reluctance to open up the Act to amendment is clear. Everyone puts the blame on DOE.

Today DOE has its chance to respond. I have asked Ben Rusche to be prepared to speak to the issues the States and Tribes have raised, point by point if necessary.

I hope very much that we can begin to sort out the real issues from the emotion that has engulfed this program. It is absolutely essential that we determine the circumstances under which the program can go forward. If we cannot find that combination soon, the Act will be very much in danger, and the work of many years, not to mention a very substantial amount of money spent, will have been wasted.

The CHAIRMAN. First, may I ask my distinguished ranking minority member, Senator McClure, if he has any comments?

STATEMENT OF HON. JAMES A. McCLURE, A U.S. SENATOR FROM THE STATE OF IDAHO

Senator McCLURE. I commend our Chairman for having scheduled these hearings. I appreciate the time and effort that the witnesses have gone to to come forward and testify. We will have, before the end of these hearings, built a hearing record. But I think even more than that, our object is not just to build a record, but to build a repository.

Somehow, out of all of this, we have to look at what has gone wrong, if it has gone wrong, and there is evidence that it has, what the deficiencies are in the statute, if indeed there are; what changes need to be made, if indeed there need to be changes in either the statutory framework or in the process.

I look forward to your testimony, but I second the motion that was made, if one was needed, to invite you to give us a little bit of a background overview of what this program is all about.

Thank you, Mr. Chairman.

[The prepared statements of Senators McClure, Hatfield and Hecht follow:]

OPENING STATEMENT OF
SENATOR JAMES A. McCLURE
FEBRUARY 5, 1987, HEARING ON DOE'S NUCLEAR WASTE PROGRAM

I welcome Mr. Rusche back to the Committee for what is our third and final leg in a series of lengthy hearings on the current status of the Nuclear Waste Disposal program.

I hope that the time that the Members, the States, and the Administration have devoted to this effort has not been in vain. It is not our intent to bring all these parties forward just for the purpose of building a record. What we want to build is a nuclear waste repository facility.

But based on what I've heard so far in these hearings, I'm not sure we're going to get that task accomplished. Not, at least, if things continue on the course they are now headed.

This prospect gives me great cause for concern. For I still believe, as most everyone here believes, that the Nuclear Waste Policy Act is still a reasonable and well-balanced piece of legislation. But somehow, in its translation into reality, something has gone amiss.

I would like to believe that the problems merely reflect the political ploys that wreck havoc on programs as unpopular as this one is.

But the signals I'm receiving go beyond the more than 40 lawsuits, beyond the unmitigated rhetoric, and beyond the State veto threats that are "a given" in this program.

The signals I'm receiving go to the very heart of the program. On the one hand, I get very clear signals from the Department that they do not intend to follow the provisions laid

OUT IN THE STATUTE IN THE MANNER THAT CONGRESS ORIGINALLY INTENDED.

AND ON THE OTHER HAND, I AM HEARING SOME VERY COMPELLING ARGUMENTS FROM THE STATES THAT LEAD ME TO BELIEVE THAT THEIR LACK OF CONFIDENCE IN THE PROGRAM IS PERHAPS WELL FOUNDED.

NOT THE LEAST OF THESE ARGUMENTS IS THE FACT THAT STATES HAVE BEEN FRUSTRATED AND THWARTED IN THEIR EFFORTS TO PROVIDE MEANINGFUL INPUT INTO THE SITE SELECTION PROCESS, AND THAT, IN FACT, THE POSSIBILITY OF NEGOTIATING CONSULTATION AND COOPERATION AGREEMENTS IS SO REMOTE AS TO BE TOTALLY OFF THE HORIZON.

BUT EVEN SOME OF THE TECHNICAL ASPECTS OF THE PROGRAM APPEAR TO BE IN JEOPARDY, AND DESERVE SOME CAREFUL SCRUTINY. FOR, WHEN SOME OF THE VERY PEOPLE WHO WERE INVOLVED IN FORMULATING THE SELECTION PROCESS BEGIN TO CRITICIZE THE RESULTS, AND WHEN THE BODY ULTIMATELY RESPONSIBLE FOR LICENSING THE DISPOSAL FACILITY RAISES SERIOUS QUESTIONS ABOUT THE DEPARTMENT'S INTERPRETATIONS OF VARIOUS FACTS, THEN I REALLY START TO WORRY.

MR. RUSCHE, FOR SOMEONE AS DEDICATED, HARD-WORKING, AND OPTIMISTIC AS YOU ARE, I HATE TO PAINT SUCH A BLEAK PICTURE FOR YOU. BUT I CANNOT DENY THE FACT THAT WE ARE ALL VERY CONCERNED. AND WE ARE ALL VERY ANXIOUS TO HAVE YOU PRESENT YOUR OWN ASSESSMENT OF THE SITUATION. AND WE ARE HOPEFUL THAT YOU WILL GIVE US REASON TO RENEW OUR FAITH IN THE PROCESS.

I WISH AGAIN TO OFFER YOU, AS I DID SECRETARY HERRINGTON LAST WEEK, MY SINCEREST PLEDGE OF ASSISTANCE TO SEE THAT THIS PROGRAM GETS BACK ON THE RIGHT COURSE.

SENATOR MARK O. HATFIELD
COMMITTEE ON ENERGY AND NATURAL
RESOURCES
HEARING: BEN RUSCHE, DIRECTOR, OFFICE OF
CIVILIAN RADIOACTIVE WASTE MANAGEMENT
FEBRUARY 5, 1987

Mr. Chairman:

First, I want to convey my thanks to you for having agreed to hold this series of hearings on this issue of monumental importance to the Pacific Northwest and the rest of the nation. During the last session of Congress it became apparent that the site selection process for the high level repository was in jeopardy. Accordingly, I believe that the early scheduling of these proceedings in the 100th Congress is a testament to your commitment to get the site selection process back on track.

The previous two days of hearings on this subject have indicated that the members of this committee are undivided in their belief that the Department of Energy is mismanaging its duties as specified by the Nuclear Waste Policy Act. Like other Senators, I am concerned that the Department's proposed actions with regard to the siting of a second repository, as well-meaning as they may be, may place the entire waste disposal program in danger. While I recognize that the Nuclear Waste Policy Act may not be a perfect legislative vehicle, and does place a terrific burden on the Department of Energy, the Department's recent proposals as outlined in its revised Mission Plan are obvious misreadings of the Act's provisions. I would encourage the Department of Energy to dispense with these proposals and adhere to the law as it was written by Congress.

Although the State of Oregon is not one of the three suggested host states for the first repository, it does have an intense interest in the outcome of the site selection process. The Hanford site, in the State of Washington, is located in close proximity to the Columbia River. The Columbia River, which separates the states of Oregon and Washington, is Oregon's most important waterway. The precious waters of the Columbia and its tributaries are used for a myriad of purposes including navigation and commerce, irrigation, drinking water, and the generation of electricty, to name just a few. The contamination of this great river would represent a blow from which Oregon never could recover completely. The potential hazard that the siting of the repository at Hanford represents for Oregon is heighthened by the fact that the Columbia River flows past communities that comprise more than half of Oregon's population.

I want to make it very clear that I do not oppose the siting and construction of a waste repository. Our nation has a growing inventory of nuclear waste which must be disposed of safely, and the Department of Energy has been charged with carrying out that arduous task. However, the Department must not base its decision on political or other non-scientific considerations, as some preliminary information already suggests.

It is my hope that the Department of Energy will heed the advice and warning of this committee and turn this program around. The Congress has given the Department a road map to follow - the Nuclear Waste Policy Act. Any large-scale excursions away from this map surely will result in peril both to the repository program and to the nation as a whole.

Thank you Mr. Chairman for allowing me this time to present my testimony before the Committee.

STATEMENT OF SENATOR HECHT

Mr. Chairman, I would like to thank you for holding this third hearing on our nation's high level nuclear waste disposal program.

We have heard a lot during the last two weeks on this issue, and we've been able speak with representatives from other nations as well. To use Secretary Herrington's analogy, I hope the Energy Department has gotten the message that its Board of Directors does not exactly endorse the Department's activities of the last two years.

I do believe we can see progress in two areas, although there is still much to be done. Last week the Energy Department finally made it clear that they will obey the law and support a second repository. Now we have to convince the Department that they should work on that repository according to the schedule required by the law.

Secondly, and this is particularly significant from Nevada's perspective, Energy Secretary Herrington sat in front of us last week and agreed that I was right last year when I argued that we need to investigate any technical relationship between the necessary and continued nuclear testing at the Nevada Test Site, and the location of a possible repository a mere fifteen miles away. If the weapons tests are going to cause manmade earthquakes around a waste repository, we better know about it before we build the repository.

I hope, Mr. Chairman, that under your leadership this Committee will be able to find a way to straighten out a program that so far has not fulfilled our expectations.

STATEMENT OF BEN C. RUSCHE, DIRECTOR, OFFICE OF CIVILIAN RADIOACTIVE WASTE MANAGEMENT, DEPARTMENT OF ENERGY

Mr. RUSCHE. Mr. Chairman, Members of the Committee, I am delighted to have the opportunity to meet with you today. Following our discussion with Secretary Herrington last week, it seemed to me that some continuation of the discussion and perhaps some additional areas might be productive. So I welcome the opportunity.

I have a statement that has been prepared, and in light of your immediate invitation, I would like to request that the full statement be included in the record, and I will, after a few moments, try to summarize it as briefly as I can.

The CHAIRMAN. Without objection.

[The prepared statement of Mr. Rusche follows:]

STATEMENT BY

BEN C. RUSCHE, DIRECTOR
OFFICE OF CIVILIAN RADIOACTIVE WASTE MANAGEMENT
U. S. DEPARTMENT OF ENERGY

BEFORE THE

ENERGY AND NATURAL RESOURCES COMMITTEE
UNITED STATES SENATE

FEBRUARY 5, 1987

Mr. Chairman and Members of the Committee:

I appreciate the opportunity to appear before you today to discuss recent developments and issues of concern to the Committee regarding the program being carried out under the Nuclear Waste Policy Act of 1982 (NWPA).

Last week, we released a draft amendment to the Mission Plan for the Civilian Radioactive Waste Management Program and the Secretary testified before you to discuss the purpose of the information contained in the draft amendment. We have sent it to States and affected Indian Tribes, the Nuclear Regulatory Commission and other Federal agencies for comment and have made it available for public inspection. During the 60-day comment period, we plan to meet with affected States and Indian Tribes to answer any questions they may have regarding the amendment that may assist them in formulating their formal comments.

The purpose of the Mission Plan amendment is to keep Congress, as well as others, informed on progress in the program. When the Mission Plan was issued in 1985, we said it is "today's best estimate of the scientific, engineering and institutional information needed to make informed decisions as we proceed with developing ... the disposal system." We explained that it is a planning document, and as such, we would review it annually and revise it on an as-needed basis. The purpose of amending the Plan is to ensure that it reflects current significant developments and plans.

The draft amendment released last week is the first such amendment and presents our estimate of how and on what schedule we believe we can best fulfill our responsibilities in carrying out the repository program. After the 60-day comment period, we will revise the amendment in response to the comments as appropriate and will submit it formally to Congress.

The focal points of the draft Mission Plan amendment are:

- Achievements in the first repository program including the nomination and recommendation of sites for detailed site characterization;
- As a result of reevaluations of the work necessary to proceed, a five-year extension of the schedule for the first repository;
- New waste-generation data that, along with other considerations, indicate that it is prudent to indefinitely postpone site specific activities for the second repository while continuing technical development activities;
- Developments concerning the submission to Congress of a proposal for a monitored retrievable storage (MRS) facility as an integral part of the waste management system; and,
- Actions taken and progress made toward better defining the consultation and cooperation process with eligible States and affected Indian Tribes.

With these points in mind, I would like to discuss the status of the program as it is reflected in the draft Mission Plan amendment.

First Repository

Last May, DOE nominated five sites in Mississippi, Nevada, Texas, Utah and Washington as suitable for characterization and issued Environmental Assessments for each of those sites. The Secretary recommended to the President three of those sites for characterization as candidates for the first repository. The three sites are: the Yucca Mountain site in Nevada, the Deaf Smith County site in Texas and the Hanford site in Washington. The President approved the Secretary's recommendation and that action formally marked the beginning of the site characterization phase.

This represented a major milestone in the siting of the first repository and years of work in gathering and analyzing geologic and environmental data from site studies that began before passage of the NWPA. Reaching this stage of determination permits us to thoroughly investigate, evaluate and compare geologic, environmental, transportation and safety factors at each of the three sites.

Site characterization will take five-to-seven years, depending on the site. It includes laboratory investigations; surface-based data-collection activities, such as geologic mapping and seismic surveys; studies conducted through the drilling of boreholes; and studies conducted in the candidate host rock in exploratory-shaft facilities.

Although we had planned to begin exploratory shaft construction at one or two of the sites this fiscal year, Congress, in the appropriation for the waste program for Fiscal Year 1987, specified that no funds are to be used for drilling any exploratory shaft at any site in FY 1987. However, Congress did allow for site-specific work, other than exploratory shaft drilling, to be conducted at reduced funding levels.

The current activities at or related specifically to each of the candidate sites, include the following:

o At the Nevada site, land access is being pursued with other Federal agencies.

o At Washington, site plans are proceeding for hydrology tests that will precede exploratory shaft drilling.

o At the site in Texas, DOE is proceeding with its plans for obtaining access to the land, and later next month, about 10 DOE and contractor personnel from our DOE Columbus, Ohio, Salt Office will be moving near the site to begin setting up a DOE office. Unlike the Nevada and Washington candidate sites, there has been no DOE office for this program located in the State.

A further elaboration of planned activities at each of the sites is contained in Appendix A of the draft Mission Plan amendment.

Two major efforts under the NWPA and associated with the beginning of site characterization are:

1. Negotiations for formal consultation and cooperation agreements with affected States and Indian Tribes; and,
2. The development of site characterization plans.

Consultation and Cooperation

The NWPA requires DOE to seek to enter into and negotiate written Consultation and Cooperation (C&C) agreements with States and affected Indian Tribes after approval of candidate sites for characterization, or earlier, if an eligible State or Indian Tribe requests. Some negotiations have occurred, but as yet no C&C agreements have been concluded. The draft amendment to the Mission Plan contains a report of actions taken and progress made toward better defining the consultation and cooperation process with eligible States and Indian Tribes.

Given the nature of the program and the reality that the perspectives of the States and affected Indian Tribes often differ from DOE's, we recognize that agreements may not be easy to reach. We plan to increase our efforts to negotiate C&C agreements. In this regard, we are considering a number of new initiatives to encourage these negotiations. For example, DOE is willing to consider the adoption and implementation of de facto agreements or memoranda of understanding that would contain less than is required to be in the C&C agreements should the State or affected Indian Tribe find this advantageous. This could allow both parties to adopt agreed-on procedures immediately, even before the C&C agreement is fully developed. Such an approach is attractive because it recognizes the importance and the achievements of the negotiation process that has been under way since the NWPA was signed into law.

But C&C negotiations and agreements are but one part of the process of working with affected parties. Every telephone call, every discussion, every meeting, every piece of paper exchanged between DOE and States, Indian Tribes and the general public provides opportunities for "consultation" and "cooperation" among parties.

We believe these daily opportunities represent the spirit and intent of the requirements regarding participation, consultation and cooperation. And we look forward to expanding these opportunities. In addition, I look forward to arrangements where State and Tribal technical staff actually work shoulder to shoulder with us, to assure active participation in site characterization.

There have been a number of actions outside C&C negotiations which have been taken recently in response to recommendations by the States and Indian Tribes. For example:

- The participation by States and affected Indian Tribes in DOE coordinating groups; and,
- The expansion of the Quarterly Meetings with States and affected Indian Tribes for the public to attend.

There are currently twelve Coordinating Groups and they are listed in Table 1. The Coordinating Groups meet two-to-four times per year and provide a forum for the discussion of common problems and their resolution. It is expected that additional coordinating groups will be established and that existing ones will be abolished as requirements and priorities change.

TABLE 1.

EXISTING COORDINATING GROUPS

The following coordinating groups are currently in existence and supported by their own charters:

- Site Characterization Plan Coordinating Group
- Geoscience Coordinating Group
- Repository Coordinating Group
- Waste Package Coordinating Group
- Performance Assessment Coordinating Group
- Licensing Coordinating Group
- Quality Assurance Coordinating Group
- Transportation Coordinating Group
- Institutional Affairs Coordinating Group
- Project Management Coordinating Group
- OCRWM Information Resources Management Coordinating Group
- Environmental Coordinating Group

Since Summer 1984, Quarterly Meetings have been held with States and affected Indian Tribes to discuss topics mutually agreed upon for the agenda. As a result of recommendations by the States and Indian Tribes, these meetings will now be open to the public. The first such meeting is scheduled for February 12 in Spokane, Washington. The agenda is being coordinated among the States, the Indian Tribes and DOE. A public announcement is being made by DOE Headquarters and the nearest DOE Operations and Project Office in Richland, Washington. The draft Mission Plan amendment will be a major subject for discussion at the meeting.

I mention these activities because I believe it is important to point out that while formal consultation and cooperation negotiations are only required to begin after a candidate repository site is approved for site characterization, consultation and cooperation is an everyday activity and responsibility -- DOE's responsibility, the States' and Indian Tribes' responsibility -- the responsibility of all the affected parties to consult and to cooperate.

Site Characterization Plans

Another major effort associated with site characterization is the preparation of a plan for characterizing each site. This plan--called a site characterization plan (SCP) -- is a major and intensive effort. For example, the scope and magnitude of this effort can be gauged from the SCPs now being prepared for publication: in each plan, the description of the characterization program alone covers several thousand pages.

Copies of each draft chapter are being shared with the NRC, States, and Indian Tribes for comment as they become available. The NWPA requires that such a plan for any candidate site be prepared, made available to the public and that public hearings be held by DOE in the vicinity of a candidate site before proceeding to sink the exploratory shafts at the site.

The SCPs are key documents and of major importance to States, Indian Tribes and the public -- as well as to NRC and to us. These plans will contain:

o A detailed specification of the information to be developed for each site, the conceptual waste package and repository design, and the issues that need to be addressed;

o Schedules for a logical sequence of testing and the timing for the issuance of publications on technical procedures, technical findings, and issue resolution; and,

o Milestones and decision points to be encountered along the way.

There is intense interest in the SCPs, since they will guide DOE during the site characterization phase until a license application is submitted to the Nuclear Regulatory Commission. The SCPs and periodic progress reports that DOE will be making, will have a crucial role in interactions with the NRC, and as vehicles for presenting information to the States, Indian Tribes, Congress, utilities and the public.

The main purposes of site characterization are to determine whether a candidate site is suitable for a repository and to provide the bases for the selection of a repository site and for the construction authorization request to the Nuclear Regulatory Commission -- tasks that have never been done before. Therefore, finding answers to relevant questions are the main focus of site characterization.

First Repository Schedule

The experience gained in achieving the important milestone of approval of sites for characterization, and advances in the technical planning of the program, have led us to reassess the program and schedule for the first repository. The new schedule -- as presented in the draft Mission Plan amendment -- shows a 5-year extension of the date for the waste acceptance at the first repository, from 1998 to 2003.

This 5-year extension of the operation of the first repository is primarily a result of additional time needed in the near term. This is not the first time that we have come to realize that additional time is needed to carry out certain activities required by the NWPA. To better illustrate where additional time has been needed and where we believe it is needed now, Table 2 in my statement shows the current schedule as compared to the schedule contained in the 1985 Mission Plan.

There are several reasons for the near-term extension. Among them are:

- The experience to date that more time has been required to involve States and Indian Tribes in review and discussion.

TABLE 2.

NUCLEAR WASTE POLICY ACT MILESTONES

COMPARISONS WITH NWPA, JUNE 1985 MISSION PLAN, AND DRAFT AMENDMENT TO THE MISSION PLAN

ACTIVITY	NWPA REQUIREMENT	1985 MISSION PLAN	1987 DRAFT AMENDMENT	ACTUAL
1. Identify States w/ potentially acceptable sites	4/7/83	--	--	2/2/83
2. State/Tribal notification as to being potentially acceptable sites	7/7/83	--	--	2/2/83
3. Issue Siting Guidelines	7/7/83	12/84	--	12/84
4. Issue Mission Plan	5/84	--	--	6/85
5. Issue Environmental Assessments	--	11/85	--	5/86
6. 1st Repository Nomination/Recommendation of sites suitable for characterization	1/1/85	11/85	--	5/86
7. Presidential Approval of sites	--	1/86	--	5/86
8. Seek to enter into C&C agreements	7/86	--	--	7/86 *
9. Issue SCP's	--	3/86 tuff 3/86 basalt 10/86 salt	mid-87 tuff mid-87 basalt 1st Qt.88 salt	-- -- --
10. Initiate Construction of Exploratory Shafts	--	3rd Qt. 86 tuff 3rd Qt. 86 basalt 3rd Qt. 87 salt	2nd Qt. 88 tuff 3rd Qt. 88 basalt 4th Qt. 89 salt	-- -- --

* Informal C&C negotiations were initiated with the State of Washington, and the Yakima and Umatilla Indian Tribes in mid 1983

ACTIVITY	NWPA REQUIREMENT	1985 MISSION PLAN	1987 DRAFT AMENDMENT	ACTUAL
11. Testing to support DEIS complete	--	12/89	1st Qt. 92 tuff 1st Qt. 93 basalt 1st Qt. 93 salt	-- -- --
12. Issue FEIS	--	12/90	4th Qt. 1994	--
13. President recommends site to Congress	3/31/87	3/91	4th Qt. 1994	--
14. Site designation effective	5/91	5/91	1st Qt. 1995	--
15. Submit License Application to NRC	--	5/91	1st Qt. 1995	--
16. NRC issues Construction Authorization	--	8/93	1st Qt. 1998	--
17. Initiate Repository Construction	--	8/93	1st Qt. 1998	--
18. NRC issues License for Phase 1 Operations	--	12/97	1st Qt. 2003	--
19. Phase 1 Repository Operations begins	--	1/98	1st Qt. 2003	--
20. Phase 2 Repository Operations begins	--	2/01	2nd Qt. 2006	--

ACTIVITY	NWPA REQUIREMENT	1985 MISSION PLAN	1987 DRAFT AMENDMENT	ACTUAL
1. 2nd Repository Nomination/Recommendation of sites suitable for characterization	7/1/89	10/91	mid- to late-90s	
2. President recommends 2nd Repository site to Congress	3/31/90	3/98	2010 to 2020	

1. Submit to Congress report describing R&D activities necessary to develop MRS proposal	7/83			6/83
2. Submit to Congress detailed study on the need for and feasibility of MRS	6/1/85	1/86	As soon as permitted	

- The recognition that more time should be provided in the future for consultation and interaction with the States, affected Indian Tribes, and other parties; and,
- The recognition that more technical information is needed.

Since passage of the NWPA, many parties have insisted that, given the controversial nature of the program, the schedule specified in the Act was not realistic and not achievable. And on several occasions, the schedule and processes prescribed in the NWPA have been expanded, as shown in Table 2, to provide additional time for input by affected and interested parties, for additional review of DOE actions or documents and for incorporation of comments or resolution of issues.

At my confirmation hearing before this Committee almost three years ago, I pledged that the schedule would not be allowed to prevail at the expense of technical excellence, safety, and public participation. And I continue to maintain that position. I respect the timetables, but where additional time appears to be needed to ensure the quality of the product, as a manager, I must recommend additional time.

We now recognize that more information, more consultation and more time is required in the near-term to ensure development of the first repository for long-term (permanent) disposal. We will remain optimistic in our planning, but realize that for many early actions, we underestimated the time required. Furthermore, DOE recognizes the potential for contingencies that are yet to appear.

Second Repository

With regard to the indefinite postponement of site-specific activities for a second repository, the Secretary's announcement last May was based on a number of factors, including declining projections of the rates at which spent fuel will be discharged from commercial nuclear powerplants; progress in siting the first repository; the expectation of Congressional approval for the MRS facility; and, responsible fiscal management.

I would like to point out, again, that we plan to propose construction of a second repository. In fact, even the lowest current projections of spent fuel generation indicate that the second repository will be needed. DOE, therefore, remains fully committed to a two-repository system.

Our current program regarding the second repository focuses on technology development. A significant portion of these studies is expected to involve cooperative efforts with other countries through continuation of the current program of international cooperation, such as that with Canada where we are participating with them in the extension of the depth of the shaft at their Underground Research Laboratory in Manitoba near Winnipeg.

A requirement related to the second repository is stated in the NWPA in terms of the maximum amount of spent fuel that the Nuclear Regulatory Commission can allow to be emplaced in the first repository until a second repository is in operation. The NWPA sets this figure at 70,000 metric tons of uranium.

Under the revised schedule for the first repository, this limit would be reached sometime after the year 2025 if a maximum annual rate of waste emplacement is 3,000 metric tons. The actual schedule for when the second repository should be considered, however, should be based on more-refined estimates of spent fuel generation rates, the time needed for the first repository to reach the limit of 70,000 metric tons and the time needed to develop the second repository.

The experience of siting the first repository suggests that site-specific screening leading to the identification of potentially acceptable sites should start about 25 years before the start of waste acceptance for disposal. Therefore, to have the second repository available by about 2025, site specific studies need not start until the middle to late 1990s.

Monitored Retrievable Storage (MRS)

The 5-year extension for start-up operations at the first repository, means a repository would not start operation in 1998. We believe that the most advantageous course is the development of an MRS. With an MRS capable of receiving waste in 1998, we can begin receiving waste in 1998 as well as provide the other major benefits an MRS provides as part of the integrated waste disposal system.

We had originally intended to submit a proposal on MRS to Congress in June 1985, but we notified Congress of a delay in the submission until January 1986. In August 1985, the State of Tennessee filed suit against the Department claiming that the Department failed to consult properly with the State prior to the identification of proposed sites for the MRS facility. We believe that we went beyond the requirements of the Act by allowing States and local communities to review and comment on our studies well before we submitted the proposal to Congress. The State provided formal comments on the proposal which will be included with our proposal when submitted.

On February 5, 1986, the U.S. District Court for the Middle District of Tennessee ruled in favor of the State and subsequently, on February 7, issued an injunction prohibiting the Department from submitting the MRS proposal to Congress.

The decision and the injunction were appealed by DOE to the U.S. Court of Appeals for the Sixth Circuit. On November 25, 1986, the Court of Appeals ruled in favor of DOE's position in the dispute, indicating that the actions taken by the Department in identifying sites for the MRS and in consulting with the State did not violate the Act.

Subsequently, the State filed a petition for stay or extraordinary writ of injunction and for a rehearing with a suggestion that the case be reheard en banc. On December 31, 1986, the Circuit Court denied the petition for a rehearing, but on January 7, 1987, granted a stay for 30 days to allow the State to appeal to the Supreme Court. Assuming a timely filing of a writ of certiorari by the State, the stay will continue until final disposition by the Supreme Court.

Our intent regarding MRS is to fulfill our statutory obligations under the Act and submit the proposal on MRS to the Congress at the earliest date practicable.

Conclusion

Following the President's approval of the Secretary's recommendation to characterize sites in Nevada, Texas and Washington for the first geologic repository, and the Secretary's decision to recommend the redirection of the second repository program by postponing indefinitely site specific work until the mid-1990's, we have reevaluated the program and schedule to put in place the Nation's high-level radioactive waste disposal system. Our conclusions and proposal are reported in the draft Mission Plan amendment. We recognize that there are areas of congressional concern, particularly involving the first and second repositories and the MRS proposal. These matters are addressed in the draft Mission Plan amendment.

We believe we have honored our commitment to provide through the draft Mission Plan amendment a basis for informed evaluation of the program and for the Congress to provide direction needed for the conduct of the program. We believe that the plan in the draft amendment presents the program that will allow us to fulfill best the objectives of the Act in light of our experience and best judgment.

Mr. Chairman this concludes my remarks. I thank the Committee for the opportunity to discuss the program and to answer questions you may have.

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Mr. RUSCHE. Let me try to accept your invitation and talk about nuclear waste, and I hate to use the word "tutorial," but at least give you some background information that might be useful for all of us.

Nuclear power, born in the 1940's, as it were, was a result of the Nation's weapons attempt, that is, the activity to produce nuclear weapons. Also, the Nation gained the technology to use this powerful atomic force as a peaceful, safe power source for not only our Nation, but for the world.

The very early people who were involved, and although I was not involved in the 1940's, I certainly began to be involved in the very early 1950's, and I remember as a youngster coming out of college and being introduced into the nuclear environment. We didn't have many courses; the courses were "do-it" courses, learning to do it in the laboratory, learning to do it on site, so to speak, and if I recall correctly, one of the very first questions that I encountered was, "What do you do with the waste that is left over from such an operation?"

Some folks seem to think that nuclear waste is a very peculiar circumstance, that it is unnatural, as it were. That the nuclear process producing this stuff that we call waste must have something wrong with it.

I would start by noting that every physical process that we know of that consumes energy, and many that are otherwise active, but certainly those that consume energy, produce additional products. Generally, these products are non-useful, in some cases they are useful, but virtually everything we do biologically or physically, produces waste. In that sense the nuclear reaction is common to all kinds of physical reactions.

In the very early part of the nuclear age, there was not nearly as much knowledge as we have now. There was knowledge that said to all of us that this material certainly has unique properties and that we need to watch over it and eventually we will need to dispose of it.

So in the very early days of the nuclear materials program for National security and defense, waste that resulted from those processes was stored as a liquid, or a liquid salt mixture in large tanks.

The CHAIRMAN. Now this is after reprocessing of military wastes?

Mr. RUSCHE. After reprocessing.

The CHAIRMAN. Tell us the difference between military waste which has been reprocessed and this kind of waste, which is not reprocessed.

Mr. RUSCHE. Military waste, following reprocessing, generally appears first as a liquid, and its principal difference in terms of content is that some of the long-lived radionuclides have been reduced in concentration. We would try to recover the uranium and try to recover the plutonium which are desirable products.

From the standpoint of a waste system, such as we are talking about today, that is important perhaps in very long-term considerations, but of relatively less importance from the design point of a repository.

The CHAIRMAN. Let's make this clear to everyone. We are not dealing with liquid waste, because everyone remembers that up in Hanford, the liquid waste, reprocessed waste, was put in tanks and has leaked out and give problems. We are not dealing with that here, are we?

Mr. RUSCHE. The repository system or disposal system which you established under the Nuclear Waste Policy Act is intended to dispose of solid waste.

The CHAIRMAN. And, as a matter of fact, we have the technology now, even with reprocessed waste, to put that in glass form or vitrified form, so that that should not—we have the technology to deal with that, whether we have the will to do it or not—even though we are not dealing with that here, they can do that successfully.

Mr. RUSCHE. But Senator, indeed, we are planning to do it. That is, the defense waste which is being produced, has been produced at Savannah River, has been produced in Idaho, and to some extent in the future, at Hanford, will be converted to a vitrified material. You will recall that there is a large plant being constructed at Savannah River for the purpose of vitrifying all of that waste at Savannah River. Eventually it will be done, and that waste then will be a part of the disposal system that we are talking about.

The CHAIRMAN. Okay. Let's get back to this waste that we are dealing with.

Senator EVANS. Mr. Chairman, I wonder if I could just interject a question at that point. I think you said that the defense waste was liquid. Defense waste at Hanford still is liquid, isn't that true?

Mr. RUSCHE. The wastes that are in tanks are in a water environment. The wastes, themselves, generally are in a salt or sludge-like mixture, but it is in a wet or water-like environment.

Senator EVANS. There are no current plans for vitrifying that any time soon.

Mr. RUSCHE. Senator, I think you know that the defense waste issue is under consideration at Hanford by virtue of a programmatic, or an EIS on the waste program at Hanford. The new waste that is being generated at Hanford is anticipated for sure to be vitrified, and by the same manner and program that is being done at Savannah River.

The waste residue, which has had extracted from it some components that have been made useful from a long time ago—the so-called 140-or so old tanks, is a matter that is under discussion in that EIS. I am not sure what will come out of that, but I think it is premature to say that under no circumstances would it receive further treatment. It might, but it might turn out that we would all agree that an additional, or other kind of mode would be satisfactory.

Senator EVANS. It is not premature. It is long past decision time.

The CHAIRMAN. I certainly agree with the Senator from Washington that that liquid waste, military waste which we are not dealing with here—I have to keep saying that over and over again, so we can get that message through—but that that can be safely dealt with; whether it will and in what manner it will be safely dealt with is another question.

But it can be and should be either vitrified or otherwise safely dealt with. But that liquid waste in Washington is a different thing from the civilian waste that we are dealing with in these repositories.

Senator HECHT. Excuse me. Would you clarify one point, Mr. Chairman?

The CHAIRMAN. Certainly.

Senator HECHT. You say military waste is going to be put into the repository, is that not correct?

The CHAIRMAN. No. Military waste will not be put in these repositories.

Senator EVANS. No, I think that is incorrect.

Senator HECHT. That is not right.

Mr. RUSCHE. Vitrified military wastes will be placed in the repository.

The CHAIRMAN. Not the kind of liquid waste we are talking about in Washington.

Mr. RUSCHE. Correct.

The CHAIRMAN. Only that which comes from Savannah River, which has been vitrified and is in solid form.

Senator MCCLURE. There is also another body of military wastes in Idaho that will go to a permanent repository when it is built. Those will go through the chemical treatment plant, they are calcined wastes and they are solid in form.

Mr. RUSCHE. And very likely they, too, will be vitrified before they are placed in the repository.

The CHAIRMAN. The point I want to make clear here is that we are not talking about the kind of liquid waste that can leak out, that we are putting in what I call civilian repositories. People have this picture of waste that can leak.

Now it might otherwise leech out, but it can't leak out. Please go ahead.

Senator HECHT. Excuse me, Mr. Chairman. Military waste will be in the repository; is that not correct?

Mr. RUSCHE. Mr. Chairman, may I make a statement to try to be precise?

The CHAIRMAN. Yes.

Mr. RUSCHE. Section 8 of the Act required the President to give consideration as to whether there should be a separate repository for military wastes, or whether it should be stored and disposed of finally in a common repository. The President made that determination about two years ago, the determination namely that there need not be a separate repository; that military waste placed in the proper form could and should be, and now we plan, to be disposed of in the same repository that Senator Hecht is referring to.

It is not liquid waste.

Senator EVANS. Mr. Chairman, I brought it up and I am very much aware of everything you have said in terms of the differences, but I intend to keep bringing it up until we get some relief. We have waited for 40 years, when they slopped it onto the sand at Hanford and we have not gotten any relief yet.

The CHAIRMAN. Yes, I quite agree that that ought to be done, and we will continue to bring that up. I know Senator Adams also feels the same way. I have heard him say that many times.

Senator ADAMS. Chairman, I do, and what we are concerned about is if we vitrify the military wastes over there, we have a process for doing it, and it all ends up in the same repository, we have a real transfer problem at that point. That is why we brought it up and continue to bring it up.

The CHAIRMAN. Please proceed.

Mr. RUSCHE. The waste that arises from civilian nuclear power plants in the United States and which will be disposed of in the repository will be disposed of as spent fuel, which is a solid material encased in cladding, generally zirconium cladding, which was designed for and has, in general, been shown to be adequate to protect and contain the nuclear wastes, as it were, in the fuel in operation in the reactor, and likewise, will be a good container for it when it is placed in the repository.

In addition, that material containing the radioactive waste would be additional encased in sealed containers and those sealed containers placed in favorable chemical environments in the repository, all of which are for the purpose of providing the assurance that, first, none of the material leaks—but we don't make perfect systems. If it does leak, that it is in a circumstance where it would be retained by the environment in which it is placed, and finally, in the design of the repository, placed in a site where even if it has leaked and even if it is there, its relatively low concentrations or content would be restrained from or isolated from the biosphere, or from people for a very long time.

The CHAIRMAN. All right. Let's get a little more basic here. Now, a fuel rod looks like a rod; zirconium looks like stainless steel. It is a metal. Can it rust?

Mr. RUSCHE. It cannot rust, but it can corrode.

The CHAIRMAN. It can corrode, and what is the period of time in which it can corrode?

Mr. RUSCHE. It depends on the chemical condition, but under the conditions that we would expect, it would be for a long time. I don't think I can specify 10 years or 10,000 years. The package which consists of the several elements that I have just discussed is aimed for lasting a minimum of 300 years, and hopefully 1,000 years.

The CHAIRMAN. When you say the package, what do you mean the package?

Mr. RUSCHE. The fuel rod inserted within the sealed container.

The CHAIRMAN. Is it the container or the fuel rod?

Mr. RUSCHE. The combination. That package combination.

Senator MELCHER. Might I inquire when this encasement procedure starts?

Mr. RUSCHE. The fuel encased in zirconium is placed in the zirconium when it is manufactured, before it is inserted in the reactor.

Senator MELCHER. That is already encased before it leaves the power plant.

Mr. RUSCHE. Yes, indeed.

Senator MELCHER. Then you mentioned several other procedures of encasement. When do they occur?

Mr. RUSCHE. They would occur, depending on the final design of the waste disposal system, they might occur at an MRS, which is our proposal in the draft Mission Plan and has been our proposal, which would be a central facility for receiving such material and providing this additional packaging. If we do not have an MRS, we would have facilities at the repository in which this would be done before it is emplaced in the geologic environment.

Senator McClure. Mr. Rusche, I think you have missed one important part, and that is, it is placed in a cannister before it leaves the power plant for transportation.

Mr. Rusche. It is placed in a shipping cask, Senator, which may not be the same package that I was referring to. It is certainly placed in a safe, highly reliable and well-tested shipping container to transport it to either the MRS, or to the repository where it is placed in this final sealed package that I mentioned.

The Chairman. Now, Mr. Rusche. The rods come out of the reactor, and you put them in a swimming pool to cool them down for how long—that is, at the site?

Mr. Rusche. The time required or the time utilized for cooling is purely set by the circumstances in which you are operating. The requirements of the Nuclear Waste Policy Act are that we design a waste disposal system which is capable of receiving such fuel rods after they have been cooled for only five years. With the operation of the industry has it has been now, for many years, the fuel that we will dispose of in the repository at the beginning of disposal will be more than 30 years old, having been cooled generally in pools for about 30 years.

The Chairman. Now tell us the nature of this waste. It comes out. It is physically hot; it is also radioactive. It is emitting gamma rays. Tell us about the waste heat and the gamma rays and the alphas and betas. Just in a basic way.

Mr. Rusche. Nuclear waste is waste and possesses its properties because in the fission reaction, all of the radioactivity that is potentially available does not occur, or is not released at the instant of the fission event. That is, the energy that creates heat which produces power.

A small fraction of that, quite a bit less than one percent, remains to occur at some later time as a part of the natural radioactive process, and in fact, that is what constitutes the radioactivity in the waste, as it were.

That radioactivity appears either as gamma rays or electromagnetic radiation, such as analogously, x-rays, penetrating radiation, or beta particles, which are essentially electrons which are much less penetrating, and alpha particles which are even less penetrating but highly energetic.

As time passes, these products decay. That is, per unit time, every unit time, some fraction of these particles lose their radioactivity. That time is called the half-life. The half-life is very simply the time required for a given quantity of any of these products or materials to lose half of their radioactivity.

The principal constitutents that cause us to give attention to this waste for such a long period of time are strontium and cesium and very long-lived nuclides, such as uranium, but particularly plutonium, technetium and some of the iodines.

There are many other radioactive species, but they tend to have either shorter lives or less energetic particles. Therefore, the bulk of our attention is focused on the isotopes that I just mentioned.

The Chairman. You don't have to tell us what the isctopes are, but the rods come out of the reactor. They are, in effect, red hot and there is some curve that goes down like this, pretty fast, on waste heat which is the same curve, as I understand it, that it goes down for gamma rays or radioactivity.

How long is that curve? How quickly does it cool? Tell us that?

Mr. RUSCHE. Perhaps the best way to think about that is to try to relate it to something natural. How long would it take the material to return to some kind of radioactivity concentration, about like we see in nature? In fact, this is the criterion that the Environmental Protection Agency selected for making its specifications for the waste program; namely, that you should design the program so that you would have high confidence that waste disposed of would be retained until it was no more hazardous than a uranium ore body.

Now uranium ore bodies have different concentrations of uranium in them. For an ore body that had two or three percent uranium in the ore, the time required for the fuel to decay to that level of non-hazard, so to speak, is of the order of several hundred years.

The CHAIRMAN. Less than 1,000?

Mr. RUSCHE. For an ore body of two or three percent, that is correct. Most ore bodies are not two or three percent. There are some that have that higher concentration.

The CHAIRMAN. When you say less than 1,000, I remember the figure of 600 years for two to three percent; is that right?

Mr. RUSCHE. It is of that order. Again, these numbers can be dealt with very precisely given a precise set of conditions. I am just dealing with some general ones.

The CHAIRMAN. But we can say, in general, less than 1,000 years?

Mr. RUSCHE. For an ore body of two or three percent. An ore body of one percent, it probably would take something like a couple of thousand years, and there are many ore bodies of one percent concentration, ore bodies that we are now using. For a concentration of a tenth of a percent, it would probably take something like 10,000 years. That is why you hear us talking in ranges of 1,000 to 10,000 years in much of the work and design work that we are doing in the repository system.

Senator EVANS. Mr. Chairman, I am not sure that that gives really an accurate picture. When you say an ore body of two to three percent, how frequently in nature do you find an ore body of two or three percent?

Mr. RUSCHE. They are relatively rare. One percent are quite frequent, and a tenth of a percent are in a lot of places.

Senator EVANS. What is relatively rare?

Mr. RUSCHE. I don't know how many two or three percent ore bodies——

Senator EVANS. Are there?

Mr. RUSCHE. Yes.

Senator EVANS. Where?

Mr. RUSCHE. I believe some of the Canadian ore bodies and a couple of the Australian ore bodies are of that concentration. One percent ore bodies are fairly widely available, and I believe a number of the Canadia ore bodies are greater than one percent.

Senator EVANS. Wouldn't it be more appropriate to use that average rather than to try to be clear at the high end and minimize the timeframe?

The CHAIRMAN. The point is the same, I mean whether you say it is 1,000 or 2,000 years—I mean, it is 100,000 years that you have to keep this. Now, between here and 1,000 years, what happens? How quickly does it drop off? Does it drop off evenly, or what?

Mr. RUSCHE. It drops off logarithmically, which means it falls off faster at the front and then begins to fall off later as you look at the combination because of the character of the process. That is, it loses radioactivity by the same fraction every unit time.

The CHAIRMAN. Now, if you went in there and got some fuel rods fresh out of the reactors and got close to them, or put them in your hands, it would kill you pretty fast, wouldn't it?

Mr. RUSCHE. It would be fatal.

The CHAIRMAN. Now, 1,000 years after that, when it is decayed down to, let's say this one percent, and you went and picked up the fuel rods, what would happen?

Mr. RUSCHE. It probably not be a wise thing to do, but it would certainly not be a hazard that is fatal.

The CHAIRMAN. Tell us why that is.

Mr. RUSCHE. Because the radioactivity had decayed over that 1,000 years intervening. In effect, you start out, if I can use a very crude analogy, you turn off the fission reaction, such as you do when you take the fuel out of the reactor; you end up with a bucket full of radioactivity, and out of the bucket for every period of time called an half-life, or take or lose half of the material that is in the bucket.

So that if a half-life is 30 years, 30 half lives later, or about 1,000 years, you have a very small fraction remaining the bucket of that which was originally there. For that reason, the hazard declines with time.

The CHAIRMAN. There is a little radioactivity in everything, including human beings, is there not?

Mr. RUSCHE. Human beings are more than a little. Human beings carry a fair burden of radioactivity, or a fair nature content of radioactivity from radioactive potassium, from tritium, and perhaps a couple other small components. But radioactive potassium, Potassium 40, is the primary content.

In fact, at the risk of being somewhat flip, and I don't mean to be so, but it is an analogy that many have made. I remember Chairman Dixie Lee Ray making it more than once, that the radioactivity that is exchanged between two persons is related, of course, to their proximity. Those of us who are happily married find ourselves both receiving radiation as well as giving radiation to our partners. That amount of radiation exchange is quite measurable. It is not hazardous—the radioactivity is not hazardous. [General laughter.]

Senator EVANS. We also learned from her that there is more radioactivity in Democrats than Republicans.

Mr. RUSCHE. I have not been close enough to tell, sir. [General laughter.]

Of course, that applies to Republicans, as well.

Excuse me, I didn't want to get us off on this note of levity, because the subject is an important one. But it does make the point; that radioactivity is a natural feature of the environment in which we live.

There is an interesting factor that I think is important for us to all recognize, and it is that this property of nuclear waste or radioactivity to decay, that is to decline in hazard as it grows older, is not characteristic of chemical wastes.

We are dealing with wastes, as I said very early in our discussion, that arise from all processes and chemical wastes, a very broad category of wastes—I believe the Congress just passed and put into law a new Clean Water Bill for the purpose of dealing with such wastes in the environment.

Many of those wastes, in fact almost all of those wastes are nondeteriorating, that is, they do not deteriorate with time unless you take special steps, like to oxidize them, burn them or what-not. Those that are elemental, like mercury, arsenic or celinium or others, do you not change in time. They are immutable in a nonnuclear environment. They do not decay.

Therefore, when we dispose of those materials we have to retain them for as long as we want to protect the public from exposure to those materials.

In the case of radioactive wastes, not only do we know more about it, but this particular property of decay allows us to have much greater confidence that future generations will be cared for in a manner that we can predict and eventually, in the time periods of a few thousands years, such as we are talking about, will no longer be subject to the hazard of the waste that we have produced.

The CHAIRMAN. Let me ask you this: When the waste comes out, the rods come out at their hottest level, what must you do to shield that from hurting someone? You just said that they could kill someone. How much concrete, water or lead or whatever the material is, do you need between you and that waste to make you perfectly safe?

Mr. RUSCHE. You have to place between the person or the thing you are trying to protect, and that material, an absorber and you have just identified several; water or concrete or lead, and the quantity depends on the density of the material. The usual protector is water. Almost all commercial power plants have the equivalent of a swimming pool as a part of their facility.

They place these irradiated fuel elements that are hazardous in the sense that we have talked about into the water for two purposes. One is to protect those who would come close to them, from exposure to the radiation. The water absorbs the radiation. The gamma rays that we talked about, the beta particles and the alpha particles, and it converts those to thermal energy. That is, it gets warm.

Those same particles within the fuel element itself, as they are passing out, deposit part of their energy and that is why the rods themselves are warm, or hot. So, the second purpose of the water is to remove the heat from the rod itself that does not appear as radiation, but appears as thermal heat.

The CHAIRMAN. How much water do you need between you and the rods to protect you?

Mr. RUSCHE. Fuel elements that are first out of the reactor are probably under 15 or 20 feet of water.

The CHAIRMAN. Do you need that much? Do you have a safety margin; how much do you actually need?

Mr. RUSCHE. Senator, I don't know off the top of my head. I think the tenth thickness of water is about a foot. So 10 feet would produce a shielding factor of about 10 to the 10th, and that is certainly adequate.

The CHAIRMAN. Let me suggest to you that in France, I stood over their hottest waste shielded by three meters of concrete. I hope, by the way, we will take a committee trip to see that in April, as well as that in Sweden. They reprocess, put them in what looks like milkcans and put a concrete plug in the top about three meters thicks.

Mr. RUSCHE. Three meters of concrete is about 10 feet of concrete, and you will recall the density of concrete is about three or four times that of water; some concretes even more than that. Heavy concretes. So that is more than the 10 or 15 feet of water equivalent that I am talking about.

The CHAIRMAN. If three meters of concrete does it, why do we want to bury this stuff 2,000 feet underground?

Mr. RUSCHE. We want to bury it, wherever we bury it, primarily to put in a place that we can have confidence that it will stay there. We are looking for a geologically stable and predictable environment. Now if you wanted to watch it for the rest of our lives, and the lives of our progeny, you can put it in the can that you are talking about, you can put it in a pool. More properly and practically, you would put it in a dry environment.

In fact, we, at the MRS, if you will recall would envision dry storage—in effect, just a big concrete can, which would have wall thicknesses of three or four feet as an entirely appropriate and safe place to store it for as long as you want to watch it.

The CHAIRMAN. Well, the point is, you don't really need 2,000 feet down to protect——

Mr. RUSCHE. Not for shielding. You go down in geologic media to try to find bodies of rock that are predictably stable, that is, they have been there for thousands and millions or many millions of years, and in mankind's experience that is about the best we can do to try to predict what is going to happen for the next thousand or ten-thousand of years.

The CHAIRMAN. Okay, it is stability and not for shielding.

Mr. RUSCHE. Correct.

The CHAIRMAN. Tell us about the transportation. You are going to put it in these big, specially designed trucks. How dangerous are those?

Mr. RUSCHE. We think they are not dangerous at all. In fact, we think they are safe and do not present a hazard to the public or to workers. The practice is to take such material that has been stored in the pools of water that we have talked about, and when it is ready to be transported for subsequent attention, for disposal in the case in the United States, we would transport it in casks which are larger either steel or concrete, or a combination of steel, concrete and lead, which would look like a large bottle into which you insert these materials.

These devices have been tested. They pass Nuclear Regulatory Commission requirements, such as temperature—subjected to various conditions—dropping, like dropping from a helicopter onto pins, or a spike; or penetration, from shock, like running into a wall, or have a train run into them, or falling off a truck. These casks have been shown in such tests, not only in the United States, but in the United Kingdom, in Germany, in Europe, as entirely suitable for shipping this material.

The CHAIRMAN. We have seen the movies and they movies say they cannot break open. We have seen the crash tests with trains, and all of that. But let's suppose they do. You have this thing out on the highway and you are coming into Reno, Nevada, on the outskirts, and it breaks open. What happens? Does everybody at the gaming tables get killed, or what happens?

Mr. RUSCHE. No, sir. You have made several very unlikely assumptions that would be required to get it to break open. But if it did break open, the material is a solid. It is not subject to volatilization, or immediately passing into the air.

The CHAIRMAN. It can't explode.

Mr. RUSCHE. It can't explode. It is not a nuclear bomb waiting to happen. The attention that would be required would be to keep people from getting close to it. If it is young fuel, its radiation level might be high enough to want to protect people from immediate access. Its age would determine how close you could get; and the way you would address covering the material would be to get an appropriate vehicle, or circumstance, in which which people could approach it and, in effect, return it to such a shielded container.

There would be immediate explosive or distributive hazard. We have had cases in which people have surmised that it might fall into a river and the river is immediately contaminated. Those are very rare possibilities, if at all.

In the physical world, one learns never to say "never 'but from a practical standpoint, the material that is being shipped is of a form that does not disburse easily.

Senator ADAMS. Mr. Chairman, if I might inquire at that point to a very practical question, not a theoretical one. We just had radium pellets in a truck dumped into the Snake River, so it is not an impossible thing at all.

The CHAIRMAN. That was not nulcear waste.

Senator ADAMS. No, they were just pellets. What I am concerned about is, you mentioned the casks—you have a minimum of three transfer points where people have to handle this, but I am concerned about the fact that you put this on the highway and you hit a propane truck and you have a fire. This is not theoretical at all, because as the Secretary of Transportation, we used to have this happen on railroads and on the highway all the time, and all you have to do is look on the Beltway.

You have then a temperature that is exceedingly high, and these rods are there, and you have the potential of a melting factor and you have various other kinds of substances, some highly corrosive, such as various kinds of fertilizer materials, various chlorines and so on. They hit out there on a highway and your cask is there, what are going you going to do about the firemen and everybody else who comes up? They probably don't know what is in. They have two fires going. Don't you have a radioactive mess, because zirconium will melt at a particular temperature?

In fact, I think it melts below the melting point of a propane fire, does it not?

Mr. RUSCHE. I don't recall. You could perhaps create a situation with propane in which you got a temperature high enough to melt it.

Senator ADAMS. I not am not talking theoretical. I am talking about carrying the stuff.

Mr. RUSCHE. My first guess is that it would not, but I would have to check that point.

Senator ADAMS. Would you please?

[The information follows:]

In the early 1980s, the U.S. Department of Transportation sponsored tests in which a spent fuel cask was subjected to a propane torch fire environment. The actual test environment simulated a rail accident scenario. However, this should also be a bounding case for highway accidents.

In these torch fire tests, peak temperatures in the cavity of the cask, where the spent fuel would be located, never increased more than 100°C during the fire. Since the specifications for casks being developed by the Department of Energy limits spent fuel cladding temperatures to less than 300°C for all normal transport scenarios, peak cladding temperatures in a cask during a propane torch fire should never exceed approximately 500°C. Given that the melting point of zircalloy is nearly 1850°C (and the melting point of uranium oxide is 2865°C), the cladding has a large margin of safety against melting.

Mr. RUSCHE. I will. But let me note, if I may, that the casks meet tests which are designed for that very circumstance. That is, they are tested to assure their stability and their reliability under conditions you have described.

Senator ADAMS. I know. Your test on fire failed, did it not?

Mr. RUSCHE. I do not know of one that failed. Perhaps you do.

Senator ADAMS. I do.

Mr. RUSCHE. I know of many that have not, and I don't know of any cask that has been certified by the NRC which has failed.

Senator ADAMS. But you do know that in your tests on casks, that you had failure in fire in your testing.

Mr. RUSCHE. I am sure there have been failures in tests, Senator, but I don't believe there have been casks certified which have failed to meet the criteria of the tests.

Senator ADAMS. Thank you, Mr. Chairman.

Mr. RUSCHE. Could I——

The CHAIRMAN. Yes, please.

Mr. RUSCHE. Let me just pass on. I was going to make another—but I think we will get off on another discussion.

The CHAIRMAN. No, I think it is important for people to know what we are dealing with and what the real danger is.

Mr. RUSCHE. I was going to point out that the cask development—we have a cask development program as a part of the Nuclear Waste Policy Act's research effort. Its objective is to assure that the kinds of conditions that we are describing here have been met.

You alluded to the circumstances of the firemen from the local community or jurisdiction might have——

Senator ADAMS. Or on the highway.

Mr. RUSCHE. Or on the highway. Today if such shipments, or such circumstances were to arise, it is the responsibility of such local jurisdictions, that I believe all of the shipment routes that the Department has involved with such materials, or the commercial sectors involved, such communities have been party to various levels of training and in exposure to the conditions—that is, being made aware of such conditions—and I would like to, if I may, refer you to a recent study done by your former associate in the Department of Transportation, on the Transportation of Hazardous Substances.

It was issued last summer, and that document dealing with all materials, including radioactive materials, drew a very strong and unequivocable conclusion, that even considering the circumstances which you have described and the perhaps imperfections that may exist in all of the transportation modes, I believe the Department concluded that nulcear waste shipments were far more safe, presented far less risk to the public than any other kind of hazardous waste shipments.

Senator ADAMS. Mr. Rusche, I would just state to you that that conflicts directly with the testimony of the three people from the three States involved who said, one, they had not signed consultive and cooperative agreements with the Department; were having a terrible time trying to do it; they didn't know about the liability that was involved and they were very concerned, because as you just pointed out in your testimony, this is being referred to State and local levels for, one, evacuation; two, for cooperative routing; three, for handling of emergencies as they occur; and four, out of the Haz-Mat Department, they have not reached agreement with these States on hazardous material, and finally, we didn't know, Mr. Chairman, that the ones from Tiawan were coming in until it was revealed by investigation.

The CHAIRMAN. Wait a minute. You said it conflicts. What he said is the material is less hazardous than other materials. You are not saying that this conflicts with that.

Senator ADAMS. I am saying what it conflicts with is the testimony yesterday of the three representatives of the States, that they had not been able to arrive at an agreement with the Department in any way on consultation and cooperation, and transportation was one of the key issues.

The CHAIRMAN. But you are not challenging what he said about the relative hazard of nuclear waste?

Senator ADAMS. I know nothing about that particular comment, Mr. Chairman.

The CHAIRMAN. Would you speak to that question, the relative hazard and why it is——

Senator HATFIELD. Mr. Chairman, could I interrupt a moment to follow up on that point? In our Appropriations Committee's continuing resolution last year, you may recall, Mr. Chairman, that we provided $499 million for the program, but we put an earmark on $79 million. That $79 million was withheld—it was appropriated, but not to be expended until there was certification by the Secretary that there had been proper consultations with the States involved.

That was to give a bit of an incentive to have the Department consult with those States. As the Senator from Washington has indicated from yesterday's testimony, it does not appear that there has been a satisfactory consultation process.

My question to you: Does the Department intend to apply, or to certify that progress with the States has been made in order to expend that $79 million out of your appropriated amount?

Mr. RUSCHE. Senator, I expect that we will come to a point in the year in which we believe that that certification can be made. I can't tell you exactly when that is going to be. At the risk, again, of perhaps seeming impertinent, and I hope you will not take it as such, consultation and cooperation is a two-party activity. If the test of the effectiveness of consultation and cooperation is to be, and it certainly is the prerogative of Congress to establish as such, that those—one of the two parties is pleased or satisfied, then that is certainly a test that would be difficult for us to make.

Senator HATFIELD. Then I would assume that you would not—if the scenario followed through that you did not ask for that $79 million, be needing that $79 million within your $500 million request for Fiscal Year 1988. I assume that we will carry over the unexpended amount if you do not certify for its use. Then we would be in a position to deduct that from your 1988 proposal request.

Mr. RUSCHE. I would hope we would not face that consideration. I think we will certainly be in a position to talk with you about the $79 million.

Senator HATFIELD. You will be seeing Senator Johnston, McClure and me at some time in the future to go over this. I will not press the matter now, but I do want to raise it in light of Senator Adams' point that he made relating to this testimony yesterday and the consultation process.

We are very serious about that consultation process, I am sure you realize, not only on this Committee, but on the Appropriations Committee, as well.

Mr. RUSCHE. Senator, I was at least as serious as you are and I hope we will have the opportunity, to some extent today, and in subsequent hearings to try to give you at least our impression of what we have done and what we intend to do and hope that you will find it satisfactory in the context of our joint interests.

The CHAIRMAN. We will want to go into that fully, but I thought it would be useful to talk about the nature of these wastes first.

Senator HATFIELD. I thank you, Mr. Chairman. I wasn't sure exactly—I came in a little late this morning—what our procedure was. I didn't mean to intrude.

The CHAIRMAN. Well, we have a very loose procedure here.

Senator HATFIELD. The questioning process.

The CHAIRMAN. I think it is useful for Senators to be able to interject and get their questions answered.

Senator HATFIELD If that is appropriate, then I will feel free to do that.

Mr. RUSCHE. Senator, I am reminded as I looked at one of my notes, that I misspoke a moment ago when I was speaking to Senator Adams with respect to the DOT study of hazardous material. I was wrong. That study is an OTA study, a study of the Congress; the Office of Technology Assessment in Congress. I apologize for misspeaking on that.

They may not have been your colleagues.

Senator Adams: Thank you. I am aware of the second study.

The CHAIRMAN. All right. You had just said that nuclear waste in transportation is less hazardous than other kinds of wastes.

Mr. RUSCHE. Yes, sir.

The CHAIRMAN. Would you expand?

Mr. RUSCHE. My point in attempting to raise this subject in that way is not so much to say that other waste is hazardous, but to try to provide some perspective which is extremely difficult to do. When the word "waste" is said, I find people become very excited, and when nulcear waste is said, they become excited-excited. Any opportunity we have to try to help people appreciate that nulcear waste certainly deserves careful and specific attention we will take, but it is not as unique as some would have us believe.

These properties that have I tried to describe, I think do provide a basis for understanding and a basis for treating that waste with confidence that may not be as easy to do in some other environments.

The CHAIRMAN. For example, when I was a lawyer, I used to represent an insurance company that insured LP gas companies and we dealt with LP gas fires all the time. Wouldn't you rather live close to a place where trucks went by with nuclear waste rather than LP gas, and why?

Mr. RUSCHE. I am always reluctant to try to cast a shadow on another element, but in terms of relative risk I think that the nuclear waste risk is far less than that, primarily because of the energetic content, that is, its explosive potential for such materials.

The CHAIRMAN. Again, it cannot explode. Can you have a Chernobyl coming out of the transportation or the storage of nuclear waste?

Mr. RUSCHE. No, sir.

The CHAIRMAN. You cannot have a meltdown?

Mr. RUSCHE. No, sir.

Senator MCCLURE. Mr. Chairman, could I interject here? A true story. I have recited it before, but maybe it deserves repetition. At the chemical treatment plant at the Idaho National Engineering Laboratory, they bring military wastes in from Rocky Flats. Those are liquid wastes and they are brought in in liquid form for treatment to put them in solid form, make them safer, less hazardous than they were before.

A few years ago, one of the national networks had a film crew out to film the arrival of one of these shipments of deadly radioactive wastes from the military program at Rocky Flats as it wheeled into the plant in Idaho. As they were there and the truck came through the gate, all of the radiation alarms went off. Of course, they were elated, because they were getting exactly what they went there to get.

They were going to be able to show on the evening news how terribly dangerous this stuff was and how sloppy the Department of Defense was in transportation, and how derelict the Department of Energy in taking care.

So they surrounded that truck with all the Geiger counters. The safety inspectors went over it from end to end, and they finally found the source of the radiation when they entered the cab and got into the suitcase of the truckdriver. It was an alarm clock with a dial that had some radioactivity.

Now naturally, you did not see that on the evening news. That was a great disappointment, I am certain, to the people who thought they were going to expose a safety hazard. I mention that only because the standards are very high and, indeed, if you could detect an alarm clock in the driver's satchel, then you must know that if there is any radiation leakage, it is going to be detected.

Now that isn't true, I would say, at every point during the transportation, obviously, but it was subject to that kind of scrutiny at the point of origination, and subject to that scrutiny at the entrance to the chemical plant.

Mr. RUSCHE. Thank you, Senator. If I may follow the conclusion that you just made, one of the things that we have been attempting to do, and Senator Hatfield, it is in the vein of your earlier admonition, in the area of transportation, we have been making a very vigorous effort to establish institutional relationships between not only the Department and States, but between States and other jurisdictions with respect to transportation.

We have issued and do have under active participation a set of activities that hopefully will lead to a National network, capable of dealing with transportation issues that we have been talking about, in a very succinct, capable and responsible manner. I think you know that within the Department we have begun to expand our procedures for departmental wastes, and they too are falling into this same kind of more public attention, more public awareness; an attempt to be as sure as we can that all of the jurisdictions through which such wastes pass, we have had the opportunity of providing both information and, where needed, training for such folks.

I think this is an example of some of the things that we are doing, Senator.

Now, if the tests were—is everybody ready to ship fuel at 3,000 tons per year, which we will be ready to do about the year 2000—then the answer is no. There remains 14 or 15 years before that time comes. We will have another generation to train before that time. But what we are doing is putting in place the institutional mechanisms for the limited shipments that occur today, most of which are non-civilian, and try to be in a position so that you and those others who are concerned will have confidence that when that time comes, that we will be prepared.

The CHAIRMAN. Mr. Rusche, let me interrupt you there. I think we have had a useful discussion this morning. Unless anybody else would like to add a parting question on sort of a primer on the nature of nuclear waste—I do not mean to give the impression that I think there is no hazard from nuclear energy at all. I think there are certain hazards, particularly that N-reactor up in Washington, a production reactor and I think it does have real hazards and we could discuss other hazards of nuclear energy.

The public feels in many instances as though they have been sold a bill of goods about something that wasn't supposed to be dangerous, and turned out to be of some danger, at least, a TMI and certainly at Chernobyl, but the point I wanted to get across here is nuclear waste is not that part of nuclear energy that really is a real hazard properly and scientifically handled.

In effect, it is less of a scientific challenge to handle it safely than other parts of the nuclear cycle, or than certainly other parts of handling wastes.

Mr. **Rusche**. May I just add a final comment? Not only is the waste—or do we know enough about the waste to treat it safely, but there is a very fundamental fact that I hope we can all keep in mind, and it is that we have the waste. The waste today sits in fuel pools of 100 reactors in 27, 28 or 29 States. It will sit in those pools until we do something to provide a more secure environment for it.

That environment is secure for a time. The Nuclear Regulatory Commission, in its waste-confidence proceeding in the latter part of the 1970's, the early part of the 1980's, concluded that such fuel could be stored for 20, 30 or 40 years, and the Commission believed that that was appropriate. But the Commission concluded that in order for reactors to operate, it was necessary to have confidence that that circumstance would be improved upon; we would move to permanent disposal.

I would hope that in these discussions, today, Thursday and yesterday, and in the days ahead, it will be very helpful if we all keep before us that we do not have the null option. That is, we cannot say, let it go away.

The question is, is what we are doing worth the money to produce the improvement, safety and security for that material. If what we are doing is not what is needed, then hopefully these discussions will make clear what is needed.

I would caution us all to not be lulled into the view that doing nothing is a responsible course. That is my personal opinion. I believe it was the opinion of Congress when the Act was passed, that it is time for this generation to do something that will provide future generations both protection against what we had done and not leave that responsibility to them.

Now if the Congress were to decide differently, then that is something that the Congress itself is in a position to decide. But in my personal opinion, we would all be remiss to lose sight of the fact that we have that fuel stored, we have the defense wastes stored, and we have no way to render them inoccuous. We can't neutralize them. If we forget them, we forget them at our own peril.

So the charge we have, I believe—I feel like I am at my confirmation hearing, you may remember, Senator McClure—the charge that we all have is to make it very much better. I believe that is what we are about.

Now, sir. I am sorry.

The **Chairman**. I am sorry Senator Sasser was not here during the earlier part. I am sure that he will be totally reassured that there is no problem in Tennessee.

Mr. **Rusche**. I would be glad to meet with the Senator privately, and perhaps I can try again.

The **Chairman**. Please proceed now with the regular part of the summary of your statement. We would rather you not read it, because I think you do very well summarizing.

Senator **Fowler**. Mr. Chairman, may I interject at this point?

The **Chairman**. Yes, indeed.

Senator **Fowler**. Only because I came a little late, and I apologize, Mr. Director. So assuming that you had already given your statement, I read it. I hope it is a little helpful. I was reassured by your statement—your last statement, but just to pursue the questions of the Chairman, and others, since you did not address this in your statement, there is a National security element to the way and under what conditions that radioactive waste is stored, is there not?

Mr. RUSCHE. I am not sure——

Senator FOWLER. Did I make myself sufficiently obscure?

Mr. RUSCHE. I would appreciate it if you would elaborate a little bit?

Senator FOWLER. There is a National security element, is there not, to the way, under what conditions, under what circumstances, under what procedures that radioactive waste is stored.

Mr. RUSCHE. Let me attempt to interpret what you said and give you my impression. If you are referring to the plutonium content of the spent fuel, then the answer is yes. That is the National security implication that I would understand.

Senator FOWLER. If you captured this stuff, you could make a bomb out of it, could you not?

Mr. RUSCHE. If you had appropriate chemical reprocessing capability at hand.

Senator FOWLER. Even if you did not make a bomb out of it, you could contaminate somebody, some person, or some river or some ground water with it, if you so desired; could you not?

Mr. RUSCHE. That would be very difficult, but it would be possible.

Senator FOWLER. But it is possible?

Mr. RUSCHE. Yes, sir. It is possible.

Senator FOWLER. So for something to have this element of something that could have this kind of National security implication is less hazardous or more hazardous is, in many ways, a specious argument, is it not, for public policymakers?

Mr. RUSCHE. No, sir. I would not think it is specious. I think it is informative for people to have an understanding about not only this material, but other materials that present that same——

Senator FOWLER. No, of course, it is, but the fact is it is going to remain radioactive for 10 million years, is it not?

Mr. RUSCHE. Not very likely, sir.

Senator FOWLER. How many million years will it remain radioactive?

Mr. RUSCHE. Within about 1,000 years, it will be about like uranium ore.

And we have some of that in Georgia.

Senator FOWLER. So the extension of that argument would be, would it not, that if it remains radioactive for 1,000 years, that would make it less dangerous than if it were to remain radioactive for 1 million years.

Mr. RUSCHE. Yes, from a hazardous standpoint. Not from a National security standpoint that you are talking about, if I am inferring correctly what you had in mind.

Senator FOWLER. I do not want to go too far on this, and I am not expert, which will be readily discovered if I go too far.

Mr. RUSCHE. I would like an opportunity to discuss the issue.

Senator FOWLER. But the point that I think would be very helpful to all of us, and by extension, the public in these hearings, is that it is extremely important, the way we go about the storage and the procedures that lead to the storage. Everything from the point of spent fuel being discharged, to the transportation, to the ultimate storage; that should not be treated in a casual way. You would agree with that?

Mr. RUSCHE. I would indeed, sir. I would think that my statement, and perhaps a more extensive discussion, would give you full confidence that there is not one element that is treated lightly. In fact, I believe that I could convince you that the efforts that are being undertaken or envisioned more than care for the consideration or concern that you are talking about.

But that remains for me to do, I understand.

Senator FOWLER. Let me just end by just observing, that the only thing that disturbed me about your testimony, both spoken and this, is that I did hear these arguments about ten years ago. And that is, the implication that technologically we have come up with something that cannot break.

You will never get the public's confidence if you make the argument that there has been, in my opinion, a foolproof way of storing hazardous nuclear material. I do not want to get all the people in nuclear energy in the audience too terribly excited so they all start writing me letters. That was the underlying message that the public got before Three Mile Island, before Chernobyl.

Somehow we had something that could not break and the nuclear reactors were totally safe. The problem with that is, it is very difficult to make something that technologically will not break. So that if the Department of Energy, and you in the capacity of director, are telling this Committee that, look, it is just a question of where the site is going to be, we have a foolproof system of storage that cannot be captured by terrorists, that cannot contaminate you if those pellets go into the Snake River, that cannot be intercepted, all I say as one who is going to try to develop the right kind of policy, I don't believe anybody is going to believe you.

Mr. RUSCHE. Senator, I apologize if anything I have said has given you that impression, or anything we have written. In fact, I believe at least twice during the earlier informational discussion, which was not directly related to my testimony for the morning, I believe I made the statement that we have learned long since that there is no physical system that can be made perfect.

Everything we do is subject to failure. I believe before you arrived we had entered a set of discussions which were aimed at trying to provide some prospective without trying to provide—what shall I call it—trying to address in absolute terms the elements of hazard and safety.

There is no question that nothing we are doing, or planned to do or envision, is asserted to have perfection attached to it.

If you had—I realize that we have not had a chance to have much discussion on the subject, but we have published many, many documents and studies all of which are aimed at making the very point that you have made. We cannot be sure for a thousand years.

The CHAIRMAN. Let me say, Senator Fowler, one of the reasons we took an hour this morning was to go into this in some detail. I am sorry you could not have been here for this. We dealt with—I think Mr. Rusche put it in good perspective; there is nothing that is absolutely safe, but I think he did compare what the relative danger of this is. I think he did it fairly, dispassionately, and not as an apologist. Not like the old AEC used to do, when they said it is so safe, so cheap—too cheap to meter. We have been sold that bill of goods. I do not think he was trying to sell us a bill of goods.

Senator FOWLER. Mr. Chairman, I apologize, if I have been redundant, certainly to the Committee. I will yield. I look forward to working with you.

The CHAIRMAN. Since we brought up this question of terrorists and National security, suppose the Symbionese Liberation Army, the Islamic Jihaad, or whatever, hijacked one of these trucks on the road. What would they have to do—or hijacked two trucks; what would they have to go to get from there to a bomb?

Mr. RUSCHE. A very extensive process which would require chemical reprocessing and some steps which no amateur could do.

Senator MCCLURE. Let me go into that for just a minute. You say chemical reprocessing. I can go down to the store and buy me a bunch of chemicals, go home into my basement and reprocess these radioactive wastes?

Mr. RUSCHE. If you were processing this material, Senator, you would only last a couple of days because the other features attached to it would render your process ineffective. You would die.

Senator MCCLURE. How many chemical reprocessing plants are there in the world today capable of handling that?

Mr. RUSCHE. Not more than eight or ten of that sort.

Senator MCCLURE. In what countries are they located?

Mr. RUSCHE. There are several in the United States. There are at least one or two in Britain, a couple in France.

Senator MCCLURE. The Soviet Union.

Mr. RUSCHE. Yes, the Soviet Union has a number.

The CHAIRMAN. They were about halfway along in Iraq before the Israelies got them, weren't they?

Mr. RUSCHE. I am unaware of that, sir.

The CHAIRMAN. That was a reprocessing plant that the Israelies bombed in Iraq, wasn't it?

Mr. RUSCHE. I think it was a reactor, but I could be wrong. I think the point is, it is not a readily available process. It is very difficult. It takes very unusual circumstances to do it.

The CHAIRMAN. How many millions of dollars and how much time to build?

Mr. RUSCHE. Many millions and months, to years.

Senator MCCLURE. When did we start to build Barnwell?

Mr. RUSCHE. Well, that circumstance, it may take decades upon decades.

Senator MCCLURE. And Barnwell was a relatively mature proposal before it was abandoned, was it not?

Mr. RUSCHE. It was, indeed.

Senator MCCLURE. That was several years in the doing.

Mr. RUSCHE. It is now several decades in the doing and has not been done. I think the important point is the material contained in the fuel is only marginally useful for a nuclear device and would require very sophisticated chemical treatment facilities.

Senator **Fowler**. Will my friend from Idaho yield? The important thing is that the material is hazardous.

Mr. **Rusche**. It is, indeed.

Senator **Fowler**. It is not so much the importance of whether or not you make a bomb on the security area. It is the threat of using it in any way if it were captured. I do not want to belabor the point because it seems so obvious, but it cannot be swept under the table by an esoteric discussion on how difficult it is to make a bomb.

If the material were captured by those that would blackmail, there are hundreds of uses for fear and blackmail that would stop far short of having to have a readily accessible reprocessing plant, to come up with a bomb. Would you not agree?

Mr. **Rusche**. Yes, Senator. I was responding to the question from Senator McClure, could you make a bomb out of it? If we want to have a discussion on terrorism, this material is hazardous as are many materials. I do not diminish or in any way reduce the potential for nuclear material or nuclear waste to be used in those environments.

It would carry perhaps an emotional potential that is even greater than some other materials. But I did not understand that to be the context of our discussion. I apologize.

The **Chairman**. How would a terrorist use a truckful of nuclear waste?

Mr. **Rusche**. I think he would do as Senator Fowler was suggesting; I have it, and you can't tell what I am going to do with it, and just go from there.

Senator **McClure**. Mr. Chairman, let's pursue that just a moment. I think Mr. Fowler very properly said that it would be a terrible mistake for us to understate the hazardous nature of this material. I would submit it is equally irresponsible to overstate the danger of the material.

If indeed a terrorist could terrorize this country by hijacking a load of material that is relatively useless to them, it would be because there is a climate of fear already cultivated in the country; the seeds planted, the public prepared, the press all alerted, to immediately say, now they have it and they are going to do something to us with it.

I say that only because I think if we are going to be able to deal with this question rationally, it must not be either overstated nor understated, as to what the risks are or what might happen. That is the reason that I asked the question about, what does it take with respect to a chemical treatment plant, to make a bomb out of it.

The minute you say—make a bomb out of it—that immediately gets implanted in the minds of the public and therefore sets the stage for the use of it as a terrorist weapon, and I think that is highly irresponsible to leave that kind of an impression.

There is simply no way a band of terrorists are going to make a bomb out of the material. Simply no way.

If it were the Soviet Union hijacking our materials to go over and make a bomb out of; yes, they could do it. I suppose if the French came here to hijack a shipment, they would find it somewhat useful to them in their program. But we don't have a program to utilize it in that way, and I submit to you and to the public that it is not subject to that kind of use.

You mentioned a moment ago that there are other wastes that are more hazardous. You have been careful not to say that too much, but let's take any number of toxic wastes in the hands of terrorists, and say they are going to put it in the water supply in New York. Much more reasonable threat to American security than that of the use of these rods, unless we have a mental picture that these are more dangerous than the physical, technological, scientific facts support.

I think it is important for us in these hearings to keep that constantly in mind, what the hazards are and what they are not so that we will deal with the hazards as they exist. I do not like to be redundant, but nobody was hurt at TMI.

There was the kind of experiment you would never have run, but the system worked to protect the public against all but one thing, fear. There was no one hurt there chemically.

The CHAIRMAN. I would say to my dear friend, because people will differ about whether TMI was a hazard, but nuclear waste is not the same hazard as TMI, whatever it was.

Senator MCCLURE. It always brought up in this context—oh, my gosh, this is terrible. Look what happened at TMI. Let's look at what happened at TMI; no one was injured. There was no radioactive release that caused any kind of a health hazard to anyone.

The CHAIRMAN. Well, we are not dealing with that part.

Senator EVANS. Mr. Chairman, could we get to the round of questions?

Senator ADAMS. I think the point that has been made by Senator Fowler, is that in 1977, this Nation made a decision that we would take charge of our nuclear waste because as uranium is breaking down into plutonium, in these waste rods, if they were allowed to move around the world, that they would cause a problem with proliferation and the potential of nations who may be hostile to our security, using this material, and building plants.

So a decision was made by the Congress and by the President of the United States, that we would control and take charge of this waste because of the security problem that was involved, of having a plutonium fission material available that could be used, or could be stored in various nations.

That has been the problem; that is the reason for the whole civilian waste program, is it not, Mr. Rusche, and the fact that we control and are going to store our wastes, rather than doing what the French do in a certain amount of reprocessing it and sending it various places throughout the world because we could really reuse the plutonium and uranium if we wished to use a different system.

We have made a national policy security decision that we will not let this civilian waste out into the world in any form; that we are going to keep it in the control and title of the United States. That is the whole purpose of this program, isn't it?

Mr. RUSCHE. It is indeed, that the United States is going to take care of its own waste.

The CHAIRMAN. If I may interrupt, and I am letting us get too far off the field, and I am afraid we are not going to get to what he has to say. But we were the policymakers in this Comittee, and really, national security has never been a big problem, or a big motivating force. That may have been a motivating force on reprocessing, which we have decided not to do. Economics has been a big force on reprocessing. But national security, in terms of people stealing our nuclear waste has never been a real consideration here.

Senator HATFIELD. Mr. Chairman, may I have my statement in the record at an appropriate place?

The CHAIRMAN. Yes.

Senator HATFIELD. I will not be able to get to my questions today, but may I submit questions for the record?

The CHAIRMAN. Yes. Certainly. Let me, if I may, we have a very freewheeling session, and we haven't let Ben Rusche get to the main part of his statement, about what he did and why he did it and where we go from here.

So please, go for that part.

Mr. RUSCHE. Mr. Chairman, I have enjoyed it. I hope that somehow we have removed more fuzz than we have created. I think we have, but I can see that——

The CHAIRMAN. I think it has been helpful.

Mr. RUSCHE. I think there are some private discussions that I would certainly welcome with some of the Members, and I would hope that this would not be taken as a casual comment. I would really appreciate the opportunity of meeting with some of you privately, and giving you at least some of the information I have. It perhaps would be useful to both of us.

Mr. Chairman, I appreciate the opportunity of talking today a little bit about the current circumstances that we all are giving attention to.

Last week, we released a draft amendment to the Mission Plan for the Civilian Radioactive Waste Management Program. The Secretary testified before you to discuss the purpose of the information contained in the amendment.

We have sent it to States and affected Indian Tribes, the NRC and other Federal Agencies for comment, and made it available for public inspection. During the 60-day comment period, we plan to meet with affected States and Indian Tribes to answer any questions that they may have regarding the amendment that may assist them in formulating their formal comments.

The purpose of the Mission Plan Amendment is to keep the Congress, as well as others, informed on the progress in the program. When the Mission Plan itself, a large document which you will recall was issued in 1985, when it was issued, we said it is today's best estimate of the scientific, engineering and institutional information needed to make informed decisions as we proceed with developing the disposal system.

We explained that it was a planning document, and as such, we would review it annually and revise it on an as-needed basis. The purpose of amending the plan is to ensure that it reflects current significant developments and plans.

The draft amendment released last week is the first such amendment and presents our estimate of how and on what schedule we believe we can best fulfill our responsibilities in carrying out the waste disposal program.

After the 60-day comment period, we will revise the amendment in response to the comments as appropriate and will submit it formally to the Congress.

In my testimony, I have attempted to note the important matters that are addressed in the amendment. Let me just highlight them. We have addressed achievements in the first repository program and they have been real. We have suggested a five-year extension of the schedule for the first repository to accommodate a number of factors I will discuss briefly in a moment.

We have reiterated our view that we think it prudent to continue on the second repository program as we have outlined, with indefinite postponement of site-specific activities, while continuing technical development activities.

We discuss briefly in the amendment the situation with respect to monitored retrievable storage and reiterate our view that we think it ought to be an integral part of the waste management system, and we have considerable attention to actions taken and progress made, and the need for more progress in consultation and cooperation.

Let me note that although we had planned to begin exploratory shaft construction at one or two of the three first repository candidate sites this year, Congress, in the appropriation for the Waste Program for Fiscal Year 1987, specified that no funds are to be used for drilling any exploratory shaft at any site in Fiscal Year 1987. However, Congress did allow for site-specific work, other than exploratory shaft drilling to be conducted at reduced funding levels. The current activities that are underway include the following, at the candidate sites in Nevada, Texas and Washington.

At Nevada, we are proceeding with land access and making arrangements so that we will be in a position to proceed with that activity of shaft work when we have the site characterization plans in place.

At Washington, site characterization plans are proceeding for hydrology tests that are essential before we finalize the exploratory shaft design and are able to proceed to exploratory shaft drilling.

At the site in Texas, we are proceeding with plans for beginning to obtain access to the land, and later this month about 10 DOE contractor personnel and DOE staff will be moving from our Columbus office into the area, and we will be seeing additional folks move as the year wears on.

There are many more discussions of these activities in the Plan and I will not take the time for the moment to get to those. But there are two major efforts that we have underway that I believe merit attention here. First are the negotiations that we have for formal Consultation and Cooperation agreements with the States and Tribes, and the second is the development of site characterization plans.

I understand you have heard from representatives of the States yesterday. In my testimony, on pages 5 and 6 following, I have attempted to provide some information related to that subject, and presuming that some of you may have read this, I think I will only note that all of us recognize that consultation and cooperation, as identified in the Nuclear Waste Policy Act is, certainly a challenging and adventuresome approach suggested by the Congress to work together.

I think it is made especially so by the nature of the activity that we are about. You heard the Secretary last week talking about our efforts. In brief, we have tried to make a good faith effort to work with the States.

The gentlemen who were here yesterday I understand have some different views on the subject, and I will be pleased to try to respond to those in detail. But we continue day by day to try to carry out the intent of the Act in working with the States.

We have made some progress, I believe. We have not reached an agreement on consultation and cooperation in the formal sense, but I wish we could perhaps turn our attention to the fact that consultation and cooperation perhaps, spelled with little "c's 'rather than big "C's", is a body of activity that must go on. I call it consultation and cooperation, with a little "c', and we all must try to work together.

We have differences. I think there is genuine interest on the part of some of the States to see us proceed at a slower rate than we are proceeding, and perhaps not see the activity proceed at all. But I would not put the words in the mouths of such folks.

I do get quite a few opportunities to be told, however, that several of the States would just as soon we were not there.

We have made some improvements, however, in how we are attempt to work with the States. If these steps could perhaps bring us closer together, I would hope that we would all continue to move in a positive direction. We have opened all of our coordinating group meetings.

All of you recognize, I am sure, that we have three major projects for a repository, and we have some 12 coordinating groups altogether. Initially, we invited the States and Indian Tribes to participate on institutional and socio-economic issues which appeared to be the original thrust of their interest.

As time has unfolded, it has become evident that the interests of the States and Indian Tribes were expansive and that everything we did was of interest to them. And we have in the last couple of months concluded that all of those coordinating group meetings ought to be open to States for their participation.

We have expanded the quarterly meetings that we have with States and Indian Tribes, and—excuse me. I said States only, but I should have said States and affected Indian Tribes are participating in those coordinating meetings.

We have expanded the quarterly meetings we have, which are primarily informational in nature, to include not only the States and Tribes, but the public. The first such meeting involving the public is scheduled next week in Spokane, and many of those folks who were here yesterday and many of my staff will be involved in that meeting.

We will continue to work—if you notice in Table 1 of my testimony, I have listed those coordinating group meetings and we are going to continue to try to find a way to work together.

Let me note just very briefly, on site characterization plans, that the activity in the program for the next five, to seven or eight years is essentially exploratory, investigative activity aimed at finding the answers to questions that we, the NRC, the States and the public will find essential to have to reach a confident conclusion that a site to be selected in the 1990's will indeed be an acceptable site.

So the site characterization effort is both expensive, and extensive. It is a major piece of work in terms of geologic exploration. We are preparing extremely detailed plans to be reviewed by the States and the Tribes, and by the NRC. Those documents are several thousand pages in length and they will be available—are being made available on a chapter-by-chapter basis as they reach some state of conclusion.

I would note that finding answers to the relevant questions are the main thrust of characterization so that we, the Commission and the public can find that confidence.

I would mention only briefly that the five-year extension for operation of the first repository is primarily to provide time up front. That is, to extend the time for characterization and to allow us to have more time for interaction with the States and Tribes and try to be responsible in that mode.

My testimony has several tables that indicate the schedule in the Act, the schedule in the Mission Plan in the past, and the schedule proposed in the draft amendment to the Mission Plan, and I will not take time to address that in detail.

I do feel compelled, Mr. Chairman, to note one thing, especially since I was involved in the hearing last week. At my confirmation hearing before this Committee, and several of you at least were present at that confirmation, I believe I was asked specifically what would be my reaction if we were faced with the consideration of meeting the schedule or carrying out the program of technical quality.

My response then and my response today is, I would feel it absolutely encumbent on me as a responsible manager, as a member of the Government, and as a human being and a citizen to tell you that a schedule just cannot be allowed to prevail over quality. The actions that we have taken, in the main, are based on that premise.

I believed it then and I believe it now. If that is wrong, I hope that out of this series of discussions, the Congress will make clear that my technical judgment, the technical judgment of others that are involved, the States and the Tribes are to be given second place in favor of schedule. That is not the manner in which the program is being constructed nor carried out at the moment.

Let me just note briefly, and perhaps there is not much more that can be said, but I will try if you have questions, with respect to the second repository I reiterate the Secretary's view of last week, and mine on several occasions with this Committee, that our objective and the action of May 28th was to make an accommodation in schedule that we thought appropriate.

We remain fully committed to a second repository. We expect that about the middle 1990's, it would be time to go back and look at that, and that is precisely the proposal that we have in the draft Mission Plan, and if Congressional direction is needed to correct our impression and our judgment, I hope that these discussions will lead to that provision.

I would note also, the draft Mission Plan amendment reiterates our view with respect to Monitored Retrievable Storage, and I think I need say no more than to come to my conclusion. Following the President's approval of the Secretary's recommendation to characterize sites in Nevada, Texas and Washington for the first geologic repository and the Secretary's decision to recommend the reintroduction of the second repository site by postponing indefinitely site-specific work into the mid 1990's, we have reevaluated the program and schedule to put in place the Nation's first high-level radioactive waste disposal system.

Our conclusions and proposal are reported in the draft Mission Plan amendment. We recognize that there are areas of Congressional concern, particularly involving the first, second repositories and the MRS Proposal. These matters we have attempted to address in the Mission Plan. We believe we have honored our commitment to provide through the draft Mission Plan amendment, a basis for informed evaluation of the program and for the Congress to provide direction needed for the conduct of the program.

We believe that the plan in the draft amendment, or that the draft amendment presents, is the program that will allow us to fulfill best the objectives of the Act in light of our experience and best judgment. But perhaps there are other views on the subject, and I hope that these discussions today and to follow will remove the questions that appear to have clouded our ability to proceed. I am committed to proceeding with the program because of your commitment to take care of the matter for America.

If that is wrong, I hope that we can get the matter back on the track. I hope that we can proceed, Mr. Chairman.

The CHAIRMAN. Thank you, very much, Mr. Rusche.

Gentlemen, we are going to proceed to not try to put the clock on Senators. In spite of what some see as evidence of the need to do that, yesterday we had some excellent questioning that lasted a bit too long. I think one Senator went for 23 minutes, but his questions were excellent and therefore, we are still not going to bring up the clock, but I would ask, Senators, to try to hold the first round to ten minutes, and then we will come back with a second round, and we want to have a little free-form here, where you can interject if you need to, because I think we get more out of that.

I hope the Chairman does not go beyond 10 minutes.

Mr. RUSCHE. Mr. Chairman, how much time will I have?

The CHAIRMAN. You should be very brief, very concise, very candid, as I know you will be.

Mr. RUSCHE. Thank you, Senator.

The CHAIRMAN. I have a number of questions, and be as brief as you can. First of all, what do you estimate the cost of characterization of each of these three sites?

Mr. RUSCHE. In general, the characterization is about $1 billion. The specific numbers that we have at the moment are for Hanford about $738, for Yucca, about $650 million and Deaf Smith, about $806 million.

The CHAIRMAN. Almost $1 billion per site.

Mr. RUSCHE. Yes.

The CHAIRMAN. Now, in an article by Luther Carter in the issue of Science and Technology, he discounted the Hanford site because of "a complex hydrologic regime and the site's proximity to the Columbia River. These factors haven't convinced DOE to discard the Hanford site."

Briefly, what is that?

[The article referred to follows:]

NUCLEAR IMPERATIVES AND PUBLIC TRUST: Dealing with Radioactive Waste

Luther J. Carter

PROLOGUE: *For nearly 30 years the federal government has been struggling to find a way to dispose of the highly radioactive wastes from commercial nuclear reactors. In 1982 a solution appeared to be at hand: Congress passed and the president signed the Nuclear Waste Policy Act.*

But as Luther Carter describes here, the national program prescribed by the act is in deep legal and political trouble. By failing to avoid sites presenting land-use and environmental conflicts, the Department of Energy (DOE) has time after time selected sites that the states find unacceptable, Carter contends. Moreover, the act, which reflected a fragile political consensus to share the burden of nuclear waste disposal between the East and the West, is now jeopardized by a welter of lawsuits. Given the current uproar, DOE will not come close to meeting the 1998 deadline for opening the first repository, Carter warns; indeed, the very concept of underground disposal of nuclear waste may be discredited.

Here Carter analyzes where the siting effort has gone astray and proposes a way out of the current impasse. He argues that seeking a distribution of repository sites over several regions is more likely to spread the misery than promote the intended sense of equity. He recommends that Congress redirect this effort to focus on a single site that is both technically promising and relatively free of land-use and environmental conflicts. Carter believes that there is such a site at Yucca Mountain in Nevada. But if Nevada is to agree to accept a repository, DOE will have to change the way it does business, Carter says. First, because no site will be free of technical uncertainties, there must be a greatly increased reliance on engineered barriers to contain the nuclear waste. In addition, there must be an increased role for independent critics and, equally important, generous incentives to reward the state for housing the nation's radioactive wastes.

Luther J. Carter received a B.A. in history from Duke University in 1951. He worked as a newspaper reporter before joining Science *magazine, where he covered energy and the environment from 1965 to 1980. His previous book,* The Florida Experience: Land and Water Policy in a Growth State, *was published by Johns Hopkins Press in 1975.*

This article is adapted from a book by the same title to be published in 1987 by Resources for the Future. ©1987 Resources for the Future, Washington, D.C.

In January 1987 it will be four years since President Reagan hailed passage of the Nuclear Waste Policy Act as the long-awaited answer to the nation's radioactive waste problem. But the act is not proving to be the answer. As now pursued the effort to select a site for the first geologic repository, a maze of tunnels mined deep underground to contain the canisters of irradiated reactor fuel, appears to be headed into a political cul-de-sac and will not come close to the act's goal of establishing the first geologic repository by 1998. Indeed, the very concept of geologic disposal might even be discredited and lost as a practical political possibility.

What is needed is a new strategy to deal with the repository siting problem and, equally important, a broad-based coalition to see that the strategy is adopted and carried out. But before coming to this strategy, consider what is at stake and why the current repository siting effort appears to be failing.

Nuclear power is subject to two indisputable imperatives: to contain radioactivity and to prevent the abuse of plutonium.

Nuclear power is subject to two indisputable imperatives. One is to contain radioactivity in reactor and nuclear fuel cycle operations. The other is to safeguard and prevent the abuse of plutonium, an inevitable by-product of atomic fission that can be made into nuclear bombs. Geologic disposal of spent fuel would help satisfy these two imperatives.

The irradiated, or spent, fuel contains all of the plutonium and nearly all of the fission products created in the fission process. In its unseparated form in the spent fuel, plutonium cannot be used as an explosive. In addition, because of the intense gamma radiation associated with the fission products, theft or forcible seizure of spent fuel for the plutonium it contains is exceedingly unlikely. Thus, to seal spent fuel in a repository in a properly selected deep geologic formation approaches the ultimate solution to containing the residual radioactivity from atomic fission and preventing abuse of plutonium.

But because the unconsumed plutonium can be reused as fuel as well as fashioned into nuclear explosives, recovering it from the spent fuel has always represented a dilemma. Reprocessing, the chemical process that separates unconsumed plutonium from the fission products, is still officially sanctioned and encouraged in the United States. But because it has been denied government subsidies, reprocessing has not been done commercially since the early 1970s and will not be revived in the foreseeable future. In a number of European countries and Japan, however, the commitment to reprocessing and recycling is strong.

But the economics of reprocessing and recycling are poor, and the elaborate security measures necessary to reduce the risks of plutonium thefts and seizures by terrorists or others can only make the economics worse.[1] If the United States, as the nation with still the largest number of nuclear reactors in operation or under construction, were confidently moving to a demonstration of direct geologic isolation of spent fuel—an alternative that is simpler, safer, more economic, and almost certainly less susceptible to political trouble and controversy—the force of the American example might be influential indeed. The example might be especially persuasive if the spent fuel could later be retrieved, leaving open the possibility of future reprocessing and recycling if fuel cycle economics and world political conditions should ever favor such a course. But unfortunately, the repository siting effort is failing. Unless the political resistance of potential host states to a repository is overcome, the siting effort will remain stymied and may have to be abandoned.

Remarkably, the two rounds of site selection moved toward political failure by paths that were very different.

On May 28, 1986, the Department of Energy (DOE), after close consultation with the White House and with the president's approval, announced that the list of candidate sites for the first repository had been narrowed to three in the states of Texas, Nevada, and Washington. Each site would undergo "characterization"—a detailed study of the geohydrology of the rock mass in which the repository would be built. This process would include exploration and testing from deep shafts; at each site total costs could run as high as $1 billion. The disclosure of this decision, a key step toward the selection of one of these western sites for the first repository in 1991, would have caused controversy enough in the affected states in any case. But it was accompanied by another decision that deepened the states' anger and resentment: DOE announced that the site screening for a second repository, which had been going on in the upper Midwest and in the East, was being suspended.

In passing the nuclear waste act in 1982, Congress required DOE to prepare plans for two permanent waste repositories. The search for a site for the second repository in the eastern half of the country was intended to satisfy a concern for regional equity as much as to meet a need for increased disposal capacity. According to the act, three sites for a second repository are to be recommended to the president by mid-1989. But now, largely in response to political pressures, this undertaking, known as the Second Round siting effort, has been essentially abandoned. As for the First Round siting effort centered in the West, it is now in deep legal and political trouble, not the least because shutting down the Second Round search in the Midwest and East upsets the balance Congress sought to write into the waste act to satisfy the West.

Remarkably, the two rounds moved toward political failure by paths that were very different, except that in each case DOE was insensitive to land-use and environmental conflicts that greatly alarm the public, intensify host-state resistance, and make site evaluations enormously difficult.

The search for the repository sites in the existing First Round inventory began in the mid-1970s. By the time Congress passed the waste act in 1982, DOE had identified nine potential sites, seven in salt, and one each in tuff and in basalt, two distinct rock types of volcanic origin.

An essential quality in a site is strong evidence of predictability. In particular, this means evidence that the repository "block"—the rock mass that would contain the maze of repository tunnels extending over as much as 2,000 acres—is fairly homogeneous throughout, having few or no major discontinuities (such as faults). Equally important, because groundwater flow could transport radionuclides to the surface, the groundwater regime in and around the site must be well understood in terms of where the water is coming from, where it is going, and the speed at which it is moving. In addition, the geochemical characteristics of groundwater and host rock must be understood, for these characteristics can have a definite, if not easily determined, effect on radionuclide retention or mobility.

When the siting efforts began, salt was seen as a particularly promising geologic medium for nuclear waste isolation because it is easily mined and dry (except for tiny inclusions of brine). Salt also tends to "creep," or flow, under pressure; thus, the mined openings would eventually seal themselves.

In the search for suitable salt formations, the emphasis was almost entirely on technical considerations; political feasibility was essentially ignored. But all of the salt sites eventually selected presented major land-use or environmental conflicts, real or perceived. For instance, the salt dome at Richton, Mississippi, deemed by DOE to be the best of the domes investigated, was next to a town. The best of the salt sites in Utah was next to Canyonlands National Park. The Texas salt formation of interest was beneath the Ogallala aquifer, on which the farmers of the west Texas panhandle region depend for irrigation water.

Politics was definitely a major consideration in looking for sites on the Nevada Test Site and on the federally owned Hanford reservation in Washington state. The prospect of siting a repository on these large, remote, desertlike reservations where the neighboring populations were accustomed to nuclear activities had seemed politically convenient. But whether the sites found there would be technically suitable and free of conflicts was somewhat a matter of chance. The basalt site at Hanford turned out to present major technical difficulties and large conflicts, especially those arising from a complex geohydrologic regime and the site's proximity to the Columbia River. By contrast, the tuff site in Nevada at Yucca Mountain turned out to have probably the greatest technical promise of any site. And although not free of conflicts, the conflicts there are quite different than those at the other sites and potentially easier to resolve.

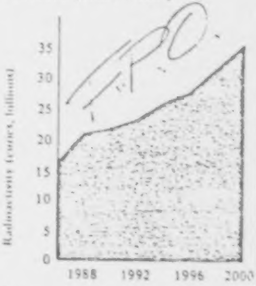
The tight siting schedule mandated by the nuclear waste act gave DOE no choice but to confine its siting activities, for better or for worse, to these nine sites, at least for the First Round. Thus, while the waste act called for "consultation and cooperation" between DOE and the potential host states, the candidate sites had essentially been selected before the act was passed. The states were consulted during the preparation of the siting guidelines, but as finally issued in November 1984, the guidelines eliminated none of the existing sites. The guidelines could serve only to help the department pick and choose among sites that the host states regarded as unsuitable. The states brought suit to have the guidelines invalidated.[2]

When DOE issued its draft environmental assessments in late 1984, evaluating and ranking all nine sites and tentatively designating three for characterization—the Hanford site, the Nevada site, and the salt site in Texas in Deaf Smith County—officials and citizens in the host states responded with an outpouring of critical, and often angry, comments. A particularly telling complaint came from Booth Gardner, the governor of Washington. He testified before a congressional subcommittee that state analysts had found that the methodology DOE used to rank the sites was seriously flawed.[3]

In a subsequent review requested by DOE, the National Academy of Sciences Board on Radioactive Waste Management found the site-ranking methodology, which by that time had been revised, to be appropriate. The board cautioned, however, that DOE's sole reliance on in-house experts in applying the methodology could introduce bias and mask uncertainty.[4]

Public opposition intensified in May 1986 when DOE announced its final selection of the same three sites. There had been speculation that the basalt site at Hanford, especially because of the great difficulty of characterizing its hydrogeologic regime, might be eliminated in favor of either the Mississippi or the Utah salt site, DOE's fourth and fifth choices. But the department stuck with the Hanford site, even though it placed last among the

Projected accumulation of nuclear waste, commercial reactors (1986–2000)*



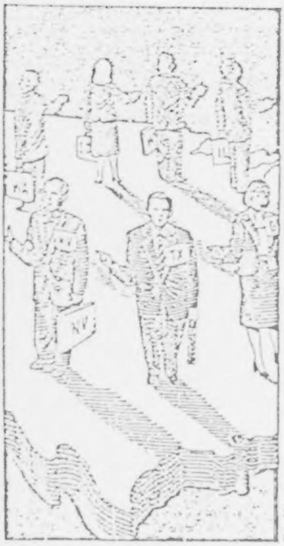
*Assumes 115.3 gigawatt operating capacity by 2000.

Source: Oak Ridge National Laboratory, *Spent Fuel and Radioactive Waste Inventories, Projections, and Characteristics*, Dec. 1985.

five sites according to DOE's own site-ranking methodology.

All five of the principal candidate sites were ranked with respect to their advantages and disadvantages for both the preclosure phase, when the repository would be built and operated, and the postclosure phase, after the repository was closed and sealed. Both preclosure and postclosure, Hanford came in last. DOE defended its decision by arguing that preclosure, Hanford had actually ranked highest among the sites if the cost of repository construction and operation and of spent fuel transportation were not taken into account.[5] DOE noted that the siting guidelines "place cost among the least important category of considerations." Postclosure, DOE said, the expected performance of the Hanford site in containing radioactivity for more than 10,000 years could be expected to be 500 times better than the Environmental Protection Agency standard. Finally, the department said that in favoring the Hanford site over the Mississippi and Utah sites, it was giving substantial weight to the greater geologic diversity that a basalt site would provide.

But these arguments were not convincing. First, there were large differences in costs for repository construction and operation. These costs were nearly $4 billion more for the Hanford site than for the Mississippi site (in 1985 dollars), and they were $5.4 billion more for Hanford than for the Nevada site. The total estimated cost at Hanford was $12 billion, with the cost uncertainty for this and the other sites put at 35 percent, either way. Second, to build a repository there might prove impossible at any price. Seven 15-foot-diameter shafts would have to be drilled to a depth greater than 3,000 feet in the hard Hanford basalt, a feat that is beyond the demonstrated state of the art. Third, DOE's assertion that a Hanford repository would far exceed the EPA performance standard is not supported by available data, which, according to the U.S. Geological Survey, are "insufficient to conclude much of anything with regard to groundwater travel time or direction."[6]



Ray Driver

Politically, however, the alternatives to Hanford were distinctly uninviting. For DOE to have dropped Hanford in favor of the Utah site next to Canyonlands National Park would have meant a battle not merely with the state of Utah but also with the National Park Service and the national environmental community. The Mississippi salt dome site would also have presented political difficulties. Mississippi is a Deep South state that is supersensitive to federal intervention. In resisting the exploration of a site for a nuclear waste repository next to a small town, Mississippi officials would have held strong political cards. In sum, by sticking with Hanford, DOE chose badly, but there was no way for it to have chosen well.

Immediately after the sites were announced, Washington, Nevada, and Texas filed lawsuits challenging the administration's decisions and the way they were reached. The litigation on First Round issues was accompanied by suits disputing DOE's authority to suspend the search for Second Round sites. The legal attacks will delay the siting effort and might derail it. In Texas DOE also faces the problem of obtaining the shaft-excavation permit required by state law to protect aquifers. But the greatest obstacle to the First Round siting effort could arise in Congress. Disturbed by DOE's decision to suspend the Second Round siting effort, Congress reduced the fiscal year 1987 appropriation from the Nuclear Waste Fund by almost half of what was requested. Part of the funds may be restored in March, but only after a congressional review. As an aide to a key senator explained, "This is a message to DOE that we are discouraged, that the program is in jeopardy and that confidence must be restored."[7] There will in any case be at least a one-year moratorium on exploration of the three First Round sites.

For the second repository, with site nominations not due under the waste act until 1989, DOE had time to undertake a new search and to give potential host states a voice in the site screening from the start. Yet despite DOE's efforts to involve them, the host states were to find the results of the site screening unacceptable.

DOE's January 1986 announcement of its tentative screening choices provoked a thunderous protest from the seven states where the preferred sites were located.

DOE was looking for a second repository site in granite or other crystalline rocks. Crystalline rocks occur in all major regions of the United States, but the search was limited to a 17-state area that included the Precambrian shield region of northern Minnesota, Wisconsin, and Michigan, plus most of the states along the Atlantic seaboard from Maine to Georgia. Through a survey of the geologic literature, DOE initially identified some 235 rock formations. Then, using an elaborate methodology developed with state representatives, the department screened out all but 12 rock bodies as candidates for further field investigations.

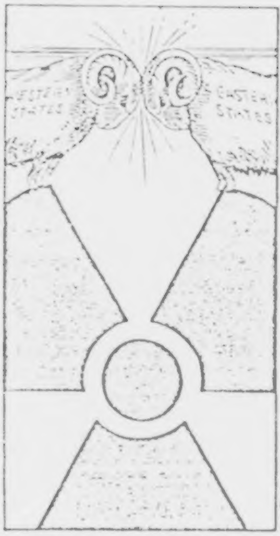
The intent of the screening methodology was to apply DOE siting guidelines in an explicit, systematic, quantitative, and objective manner that was above suspicion of bias. Each rock body was mapped on 1-square-mile grid cells. Each grid cell was reviewed against a short list of disqualifiers such as the presence of deep mines or encroachment on highly populated areas or protected federal and state lands. It was then reviewed against some 16 regional variables such as proximity to exploitable mineral resources or points of groundwater discharge.

Geologic data for the 17-state region were limited, so at this stage land-use and environmental concerns were necessarily given an important place in the screening. Moreover, DOE gave state representatives a role in the development and weighting of screening variables intended to reflect public concerns.

Nonetheless, the department's January 1986 announcement of its tentative screening choices provoked a thunderous protest from the seven states where the 12 preferred rock bodies were located: Minnesota, Wisconsin, Maine, New Hampshire, Virginia, North Carolina, and Georgia. Nowhere was the protest louder than in Maine. While the states found all the choices to be provocative, the choice of the Sebago Lake batholith, only six miles north of Portland and not far west of the Lewiston-Auburn metropolitan area, was seen to be provocative in the extreme. Not only was the site near the two largest communities in Maine, but above the rock body were numerous sizable lakes and immediately adjoining it was Sebago Lake itself, the second largest lake in Maine and the source of Portland's drinking water. When DOE officials went to Maine to brief the public on how the screening had been done, some 3,000 worried, upset, and angry people showed up—including the governor and both U.S. senators. The meeting lasted until 3:30 in the morning.

How could the Sebago Lake batholith have been chosen? The answer seems to lie in the nature of the weighting process: federal and state technocrats had pondered the relative importance of different screening variables and had come up with weighted sets which, as it turned out, allowed the site's positive features to offset the negative ones that the public later found emotionally and politically salient. For DOE the Sebago Lake batholith presented a number of advantages, including its large size and the presumed absence of earthquake or other tectonic phenomena that might impair waste isolation. But what mattered to the people in Portland was their fear that their drinking water might be poisoned with radioactivity. Across the border in New Hampshire, the overriding concern of the people of Hillsboro, a scattered rural town of about 3,000 residents sitting atop another potential site, was that their whole community and way of life was threatened. A repository project, if it came, would result in the government's purchase of thousands of acres of their land.

Immediately following the announcement, citizens, governors, and members of Congress from all three affected regions—the Midwest, New England, and the Southeast—began pleading with DOE and White House officials to stop the Second Round. Their protests came at a time when the Reagan administration was already concerned about maintaining Republican control of the U.S. Senate. Four Republican-held Senate seats were at stake in the 1986 elections in the Second Round states of Wisconsin, New Hampshire, Georgia, and North Carolina. In all of these states the Republican incumbents or candidates could be hurt by the nuclear waste issue; after all, it was their party that was running things in Washington. Rep. James T. Broyhill (R.-N.C.), running for the Senate, was particularly embarrassed by the selection of two candidate sites in his state because he had been one of the principal sponsors of the nuclear waste act.



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When DOE Secretary John S. Herrington suspended the Second Round effort in May 1986, he justified it principally on the grounds that Broyhill and others were arguing—that the decline in spent fuel generation meant that the siting of the second repository could be deferred until the mid-1990s, or even later. "To go ahead and spend hundreds of millions of dollars on site identification now would be both premature and unsound fiscal management," the secretary said.

Herrington dismissed suggestions that the Second Round was suspended in response to political pressures, as did Ben Rusche, director of the Office of Civilian Radioactive Waste Management at DOE.[8] But certainly Rusche and Herrington knew that the First Round, their first priority, was going nowhere unless the president approved the selection of sites recommended to him for characterization. They also surely knew that he might not approve them unless a way was found to quiet the political turbulence in the Second Round states. Internal DOE policy option papers are quite explicit in recognizing the "immediate political relief" that would come from terminating the Second Round search.[9]

The projected decline in spent fuel generation, while significant, had not been so great as to make a second repository clearly unnecessary. Indeed, on April 23, 1986, little more than a month before the Second Round was suspended, Rusche told a congressional subcommittee that it appeared that a second repository would be needed.

While stopping the Second Round was probably inevitable politically, this decision made the already bad problems of the First Round even worse. Several key sponsors of the waste act and all the First Round host-state senators from Texas, Nevada, and Washington immediately denounced the suspension.[10] They called it a clear violation of the act's explicit requirements for a Second Round siting process, a judgment with which the comptroller general of the United States later concurred in a formal ruling.[11]

Sen. Slade Gorton (R.-Wash.) had been a prime mover behind efforts in 1981 and 1982 to have the waste act provide for a second repository and limit the spent fuel accepted by the first repository until the second is in operation. Now, in testifying before a Senate energy subcommittee, Gorton emphasized that the various elements of the act were "inseparable" and that "the siting of a second repository is a key element that cannot be removed without jeopardizing the entire act."[12] He insisted that if DOE were going to disregard the requirement for the Second Round, then the First Round site selection process should be reopened too. "The department should conduct a nationwide search which culminates with the selection of a single site," Gorton said. Governor Gardner of Washington, appearing before the same committee, warned: "If the federal government won't play by the rules, we will see you in court. The future of a repository will be tangled in the nation's court system for years to come."

Seeking a distribution of potential repository sites over several regions is more likely to spread the misery than to promote the intended sense of equity and fairness.

An important lesson from the First and Second Round siting experience is that insuperable difficulties have been created by not excluding areas where a repository project would present major land-use and environmental conflicts. Time after time DOE's choice of sites for study has created such conflicts, from the worries in Texas over the Ogallala aquifer to those in Maine over Lake Sebago. In some cases the conflicts have been indisputably real, as at Hillsboro, New Hampshire, where many citizens would face the loss of their homes. In other cases the conflicts are arguably not real but are merely strongly perceived. The fact that a repository would be close to a town or beneath an aquifer does not necessarily mean that it would be unsafe. But perceived risks pose real problems.

Where siting choices present major conflicts, close questions about containment, or technical feasibility, are also present (or certainly appear to many people to be present). For instance, at Hanford, where the volume, velocity, and direction of groundwater flow is a major technical issue, experts argue endlessly over whether there is a threat of contaminating the Columbia River. A sure way to avoid such questions is never to propose a site anywhere near any major river. At the Deaf Smith County site in Texas, DOE must show that a repository beneath the Ogallala aquifer would not present the unacceptable risk of having water rush through or around the shaft to flood the mined openings. It also must show that there is no credible way that the aquifer could ever be contaminated. However confident DOE may be that fully satisfactory answers are in hand, these questions would never arise if the policy were to stay away from sites beneath prolific aquifers.

Another lesson is that seeking a distribution of potential repository sites over several regions is more likely to spread the misery than to promote the intended sense of equity and fairness. The elaborate, drawn-out screening process that the waste act prescribes amounts to a cruelly demanding political marathon. For instance, the several stages of the Second Round—regional screening, nomination and selection of sites for characterization, then selection of one site for licensing—would each require voluminous documentation, information briefings and public hearings in the host states, and responses to state comments and lawsuits. And as controversy heightened in the host states, the potential for trouble would be sure to increase back in Washington, where DOE is dependent on the White House for steady political support and on Congress for annual appropriations from the Nuclear Waste Fund.

Not to be forgotten is public distrust of the government's ability to cope competently and fairly with radioactive wastes.

In sum, any attempt to screen for sites over very large areas, looking at all rock formations that might conceivably be suitable, is almost sure to fail. In the effort to weigh evenhandedly the pluses and minuses of the multitude of sites, issues sure to be emotionally and politically salient become obscured—but only to DOE decisionmakers, not to the host-state politicians. Also, much of the information most relevant to the merits of the sites is not available on a regional scale. Another cause of trouble, now becoming clear in the First Round, is that even when only a half-dozen or fewer candidate sites remain, the task of comparing them is formidable and controversial. To be sure, the First Round site evaluations, comparative rankings, and ultimate choices could have been done better. But whether they could have been done well enough to promote a technical consensus on the fairness and soundness of the choices is quite another question. One difficulty lies in the paradoxical nature of the problem: sites deemed promising enough for characterization must be chosen in the absence of the geohydrologic data that only characterization can provide. The mistrust engendered by such an exercise means that attempts at "consultation and cooperation" between DOE and the host states are doomed to frustration.

Not to be forgotten here is public distrust of the government's ability to cope competently and fairly with radioactive wastes and other hazards of nuclear technology. This distrust is understandable in light of the often troubled history and flawed performance of the nuclear enterprise in this country. Nuclear power has gotten into deep political trouble because some major problems such as disposal of nuclear waste were not solved before it was introduced on a commercial scale. Distrust of DOE comes, too, from the still remembered record of waste mismanagement, including leaks from high-level waste tanks at the Hanford reservation and a foolishly premature plan of more than a decade ago by the Atomic Energy Commission to establish the first repository at a Kansas salt mine site that presented major technical uncertainties.

Furthermore, assurances of safety will not be widely believed so long as DOE persists in the choice of sites as ridden by conflict and uncertainty as the one at Hanford. Trust will be gained by building a record of sure, competent, open performance that gets good marks from independent technical peer reviewers and that shows a decent respect for the public's sensibilities and common sense. This will not be accomplished by an overly ambitious effort to screen and investigate widely scattered sites. Nor will it be accomplished without letting independent experts express their criticisms prior to key decisions rather than afterward when the bureaucracy has become entrenched in its positions.

A positive lesson from past repository siting efforts is that NIMBY, or "not in my backyard," does not always apply. When local communities perceive significant net benefits and no major conflicts, they are willing to look for something other than the dark side of repository siting. To establish a local base of cooperation and support is not a sufficient condition for host-state support, but it is surely a necessary condition.

In some instances, as at Hanford, there can be willing hosts in the absence of a defensible site. But there have been instances where the local host community has been willing and the site has been adequate for the limited project proposed. One is the Waste Isolation Pilot Project (WIPP) near Carlsbad, New Mexico, a separate project now under way to construct an underground repository for nuclear wastes from military programs. Another is the proposed Monitored Retrievable Storage (MRS) facility site at Oak Ridge, Tennessee. In the New Mexico case, local support clearly helped to keep the project alive. The WIPP facility, which is being built in a remote, semiarid area of little or no value for farming or ranching, promises to bring jobs to a community suffering from the decline of the potash industry.[13] In Tennessee, where the state has promised a veto, the project may not survive, but this case is nonetheless instructive. Local leaders at Oak Ridge found two incentives for supporting the project.[14] The first was the possibility of economic benefits such as substantial in-lieu-of-tax payments, land for a new industrial park, and commitments for the development of such project-related activities as centers for spent fuel transportation management and research. The second was a chance to gain commitments necessary not only to ensure a safe MRS operation but also to effect an earlier and more complete cleanup of environmental problems from past Atomic Energy Commission and DOE operations.

The foregoing lessons from past nuclear waste facility siting in the United States illuminate the possibilities for new policy choices.

To undertake a new national search for sites now would try everyone's patience and be a thoroughly impractical endeavor.

After nearly 30 years of fits and starts by DOE and its predecessors in grappling with the nuclear waste problem, a way out of the present impasse must be found with some urgency. Unless a confident show of progress is made soon, the geologic disposal effort will take on the appearance, if indeed it has not done so already, of an interminable trek toward an ever-receding mirage.

To undertake a new national search for sites now, as officials of some First Round states have suggested, would try everyone's patience and be a thoroughly impractical endeavor. A far more promising approach is to focus the search on a few areas and, indeed, to place the emphasis on one primary candidate site. The search for the second repository should in fact be postponed; the problem of siting the first one is quite enough for now. The insistence by First Round states on continuing the search for a second repository site reflects a strong concern for regional equity, but there are better ways of addressing that concern than by lighting political fires over much of the eastern half of the United States.

Leaving aside for the moment the political and equity questions and considering only the need to find a technically excellent site, several points should be made. One is that the current U.S. strategy of identifying several primary candidate sites and then exploring each of them in billion-dollar characterization projects is something no other country plans to do—or would feel that it could afford to do. The aim of the U.S. strategy is to lend redundancy and an important element of technical robustness to the program of geologic isolation. But while the thorough exploration of multiple sites should in principle permit the selection of the best of those studied, doing this confidently and convincingly is highly problematic, as the First Round experience has shown. Upon characterization, no site will be found to be free of technical uncertainties.

Conscious of this, Sweden is planning literally to overwhelm the uncertainty by placing the spent fuel elements in four-inch-thick copper canisters that are expected to last hundreds of thousands of years.[15] (By contrast, under current regulatory requirements U.S. canisters might not last more than 300 years.) Sweden's plans for site screening and characterization, on the other hand, are simplicity itself compared with those afoot in this country. For the United States, given the geologic siting program's present predicament, something akin to the Swedish approach seems very much indicated. The appropriate strategy would appear to be one that greatly increases the emphasis on creating a multibarrier system that can contain the wastes far longer than would be possible for a repository that relies principally on geologic barriers.

For the United States, given the geologic siting program's present predicament, something akin to the Swedish approach seems very much indicated.

This systems concept was at the heart of the recommendations of President Carter's Interagency Review Group on Radioactive Waste Management in 1979, and it contributes to the broad consensus among U.S. earth scientists and engineering geologists that geologic isolation of nuclear waste is feasible.[16] Yet as the U.S. geologic disposal effort has proceeded, engineered or artificial barriers have assumed nothing like the significance they have in the Swedish program and have in fact been accorded distinctly secondary importance.

When Congress revisits the Nuclear Waste Policy Act, as it surely will have to do, the multibarrier systems approach to geologic isolation should be emphasized as a key to simplifying and improving the effectiveness of repository siting. The policy should aim for early identification of a site that is technically suitable and relatively free of conflicts, and it should avoid vain and far-flung site-screening attempts that commit DOE (or possibly a new waste agency, as has been suggested) to a punishing procedural marathon that goes nowhere. Further, the policy should offer a way to overcome distrust by emphasizing a new openness, including a voice for independent experts before decisions are reached. Also, as I shall be emphasizing later, state and local officials and citizens should be assured that hosting a repository will offer significant benefits, thus giving them the incentive (and political room) to examine what is proposed on its merits.

If such a policy is to be instigated, one way to begin would be for Congress to commission an impartial study, which the National Academy of Sciences could be asked to conduct or orchestrate, addressing several key questions.[17] First, are there among the sites in DOE's First Round inventory any that are both technically promising and relatively free from land-use and environmental conflicts? Formal site rankings need not be contemplated. Enough is now known about the various sites to permit knowledgeable experts, simply by an exercise of careful judgment, to recommend one for immediate characterization. In essence, the task would be to see if there is not already at hand a site worthy of designation as the primary candidate for a repository, especially given the potential to develop a robust overall containment system as a hedge against uncertainty.

Second, what specific strategies and technologies can best be followed or applied in developing this robust containment system? In particular, what types of waste canisters or casks can be used as part of a strategy to greatly reduce, if not overwhelm, uncertainty? How might foreign and domestic waste packaging and other technologies be used in a test and evaluation facility at the site chosen for characterization?

Any hope of an early start on site characterization and development of a test and evaluation facility rests on identification of a primary candidate site from the existing First Round inventory. Technically, the Yucca Mountain site in Nevada seems by far the most promising. The key question, however, is whether it will be deemed promising enough to justify proceeding immediately with characterization at this one site alone. Yucca Mountain offers an important advantage in that much of it is high above the water table in a desert region of little rainfall. DOE and the U.S. Geological Survey believe, but must now confirm, that little or no water would infiltrate downward from the surface to the repository. If no water comes in contact with the waste canisters or casks, there would be no corrosion and no mechanism for radionuclide transport. Also, a repository there, about 1,000 feet beneath the top of Yucca Mountain, would permit easier access from the surface than would be possible at other sites. Access would be by two long, steep ramps tunneled in from the side of the mountain instead of by vertical shafts. Furthermore, alone among the sites in the First Round inventory, the underground openings in the welded tuff are expected to be stable enough to make backfilling with crushed rock unnecessary; this offers an enormous advantage in terms of maintaining a capability for waste retrieval.

A principal technical disadvantage and licensing problem associated with the Yucca Mountain site is the difficulty of predicting groundwater movement above the water table in the "unsaturated zone," a geologic environment that has been little studied by hydrologists. Another disadvantage is that the region is seismically active. Natural earthquakes can be expected, not to mention the earthshaking from underground nuclear weapons tests conducted at Pahute Mesa and Yucca Flats, each some 30 miles from the Yucca Mountain site. But the nuclear waste repository would be at a depth ideal for attenuation of the effects of earthquakes.[18] The principal concern would be to design all surface facilities for spent fuel handling to resist groundshaking. The nearby E-MAD facility (Engine Maintenance Assembly and Disassembly), built in the 1960s for testing nuclear rocket engines, has experienced earthshaking from scores of underground weapons tests without damage.

A repository at Yucca Mountain would not threaten, nor be perceived as threatening, a town, a park, a farming region, or a major river.

As for land-use and environmental conflicts, a repository at Yucca Mountain would not threaten, nor be perceived as threatening, a town, a park, a farming region, or a major river. The one disturbing conflict that surely exists can be eliminated if the adjoining Nellis Air Force Base is made to stop routing its practice bombing runs over Yucca Mountain.

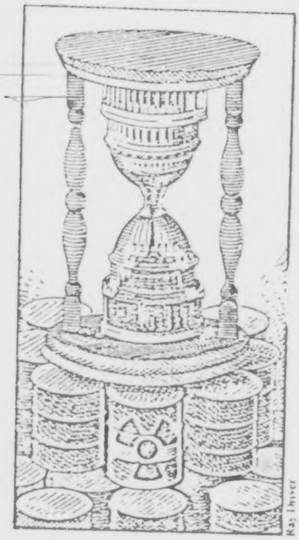
Nye County, which includes Yucca Mountain and the Nevada Test Site, basically supports the repository siting effort, seeing an opportunity for some growth and jobs for people in small communities like Beatty and Armagosa Valley. Nevada's professional engineers, labor unions in southern Nevada, and many business people also support the siting effort.

But Governor Richard H. Bryan opposes the effort, warning that siting a repository at Yucca Mountain might label Nevada "the country's nuclear wasteland" and ruin tourism. The Las Vegas and Clark County commissioners also oppose the Yucca Mountain project. But the kind of deep, visceral public opposition that has been evident in places such as southern Mississippi and west Texas appears to be lacking in Nevada. In a survey made by a Las Vegas councilman, almost half of the 2,400 respondents "did not oppose establishing a high-level nuclear waste dump on Yucca Mountain."

The state legislature has dealt cautiously with the Yucca Mountain issue, having chosen to adopt no resolutions either favoring or condemning the project. Some key members believe that nuclear waste disposal could represent an important and advantageous new use of the Nevada Test Site. If a nuclear test ban treaty should ultimately come, southern Nevada could lose the test site as one of its economic mainstays. This facility is the state's largest single employer, providing some 6,800 jobs.

A great many Nevadans are concerned about what they perceive as a lack of fairness to the state, not only with respect to the present national nuclear waste policy but with respect to how their state is treated generally. They fear that any time there is something that no other state will tolerate, federal officials will want to put it in Nevada, whether it be nuclear weapons testing, MX missiles, supersonic operating areas, bombing ranges, low-level waste or, as now, high-level waste.

The *Las Vegas Review-Journal* expressed these sentiments in an editorial the day after DOE announced that the search for sites in the East was being suspended and that Nevada was one of the three sites selected in the West. It said the issue was not safety, and that it really was not a problem of frightening tourists either. "What is at issue is the lack of fairness to Nevada, the disregard in Washington for the wishes of the people and the tendency of the technocrats and political forces in Washington to exploit Nevada's relative lack of national political power." The same day the *Gazette-Journal* in Reno voiced the same complaint but took a different tack: "Nevadans must begin to devise a strategy to exact some benefits in return [for hosting a repository] .... At long last," the editorial concluded, "Nevada deserves a break."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The *Gazette-Journal* was no doubt speaking for many, and it is just this kind of sentiment to which Congress should respond in the event that Yucca Mountain is deemed to be a suitable primary candidate site. In principle, the government could impose a repository on Nevada and provide nothing beyond compensation for actual project impacts. All of the land is federally owned, and part of it is already dedicated to nuclear activities. Also, Nevada *is* relatively weak politically, its congressional delegation being among the smallest. But for the nuclear industry as well as the state of Nevada, it would be a much surer and better course for Congress to strike a deal that leaves the Nevadans believing that they are finally getting a fair shake.

What would it take to accomplish this? If there are experts available to deal with this sort of thing, they are perhaps as likely to be found in Congress as anywhere. An effort should be made to reach an understanding with Nevada's governor, its senators and representatives, and possibly its key state legislators. This would consist of a quid pro quo, with Nevada to acquiesce in the siting activities at Yucca Mountain in return for substantial benefits, perhaps cash bonuses and generous in-lieu-of-tax payments, plus assurances that the state would be allowed a strong voice in certain matters of public concern, such as the way in which spent fuel will be shipped into Nevada. Obtaining the funds to back up such an understanding should not be a problem. Many hundreds of millions would be saved by abandoning the Deaf Smith and Hanford characterization projects. Furthermore, even a 5 percent increase in the present fee of 0.1 cent per kilowatt hour that is imposed on nuclear electricity to support the Nuclear Waste Fund would yield about $25 million a year.

Some will call such dealings bribery, but the accusation is not easily sustained. Generally speaking, bribery is to induce a betrayal of trust by the offer of money or other favors. In the current context, bribery could take the form of inducing state and local leaders to accept short-term gains for their state at the expense of large, long-term risks to be borne by generations yet unborn. But the risks need not be large; at a properly chosen site, with a robust overall system of containment, the risks can be very low, both for now and for the many thousands of years that the waste remains dangerously radioactive. However, the assurance of safety must be credible—hence the importance of a study, under independent, technically credible auspices, to reexamine and reaffirm the potential that the multibarrier systems approach holds for geologic isolation and containment.

Elegant but impractical national site-screening strategies must be seen as the prescription for political paralysis that they surely are.

If Congress, with the help of the Nevadans, can succeed in designating Yucca Mountain as the primary candidate site, there will be yet one other important task to accomplish. Congress should authorize the search for a few additional sites to serve as backups in the event that the Nevada site should ultimately prove unlicensable. This search could take advantage of a recent study by the U.S. Geological Survey of the Basin and Range Province, which includes most of the largely undeveloped and unoccupied desert lands of the American Southwest.[19] In this study, completed in 1985, six large areas—the smallest of them larger than Massachusetts—were deemed promising for waste isolation. Because the study considered only geohydrology, the next step would be to reexamine, preferably with state help, the geologically promising areas that are relatively free of land-use or environmental conflicts. After candidate backup sites have been identified, a voluntary siting approach would seem to deserve a try. The affected state and county governments could be asked under what conditions and with what benefits they would agree to siting investigations.

For a new nuclear waste policy to be adopted and successfully implemented, the interests with a stake in the outcome must find common ground. They must all agree that the problem is urgent. Although variously motivated, they must also want early progress enough to agree on the few available practical strategies. Elegant but impractical national site-screening strategies must be seen as the prescription for political paralysis that they surely are.

But the struggle over nuclear waste policy has gone on so long that the mutual suspicions that divide the familiar players—the nuclear industry, the potential host states, and the environmental and antinuclear groups—run deep and are likely to persist. The consensus supposedly represented by the Nuclear Waste Policy Act of 1982 was illusory, and the environmentalists and antinuclear activists were never really a part of it anyway.

What is needed is a new, clearer, and broader consensus, with strong participation by certain importantly affected interests that were not much heard from in 1982. These new players would include individuals and groups who worry about the risks of nuclear weapons proliferation and nuclear terrorism (the Union of Concerned Scientists, the Federation of American Scientists, and the Natural Resources Defense Council, to name a few). They would also include the governors and members of Congress from states with growing accumulations of spent fuel and military high-level waste; the utility ratepayers who are footing the bill for the waste disposal effort, together with the utility regulatory commissioners who represent them; and certain important elements of the environmental community never previously directly involved with radioactive waste or other nuclear issues, such as the National Wildlife Federation and the National Audubon Society.

These important interests would bring their own political weight to the waste policy deliberations and something more besides. By the force of their example, they could perhaps draw the nuclear industry and the environmental and antinuclear lobbyists into the circle of agreement over strategy. Otherwise, the industry and antinuclear lobbyists might well lock themselves into positions that obstruct agreement. Any proposal to find a primary candidate site in Nevada and offer generous benefits to the state is one that the antinuclear lobbyists would be sorely tempted to denounce as a cynical attempt to follow the path of least political resistance and to bribe a politically weak western state into becoming the nation's nuclear waste dump. Similarly, utility lobbyists might dismiss any proposed new emphasis on artificial barriers as a ploy to load the nuclear industry with excessive and unnecessary costs.

The most urgent consideration is to discourage the economically premature and politically foolhardy use of plutonium abroad.

Just as nearly all of the interests mentioned above stand to gain if the problem is solved, all stand to lose if it is not. Hundreds of millions of dollars have already been spent in the wrong places, and if billions more are not spent in some of those same places, it will only be because DOE is deterred by the courts or by the shattering of the fragile congressional consensus represented by the Nuclear Waste Policy Act.

But the most serious consequence of not finally putting the repository siting effort on a more predictable and promising path will be the failure to come to grips with the nuclear imperatives of containment and safeguards. The dangerous residues of the fission process, all highly toxic and some having the potential to be made into nuclear explosives, are best contained and kept secure if left in the spent fuel and isolated in deep geologic formations. Of all nations the United States has the best chance to perfect and demonstrate by the end of this century a technically and politically robust system for meeting these imperatives—and meeting them with a waste retrieval option likely to be especially important to those countries that see reprocessing and breeders as ultimately critical to their energy security.

The most urgent consideration is to discourage the economically premature and politically foolhardy use of plutonium fuel abroad. For plutonium fuel to enter routine use and commercial traffic in a world in which political instability and terrorist activity are rife presents risks that are quite beyond our powers to assess. To go along complacently in the face of such developments recalls the Joseph Conrad story *Typhoon* and the stolid Captain MacWhirr, who lacked the wit to imagine the force and ferocity of cyclonic winds. Despite a falling barometer and other ominous portents of a typhoon that would all but sink his ship, MacWhirr kept steady to his course, occasionally muttering, "There's some dirty weather knocking about." There may or may not be typhoons ahead, and the risks should not be overstated. But neither should they be slighted or forgotten. ■

NOTES:

[1] In a report issued in June 1986, an international task force on nuclear terrorism warned that the risk will increase as spent fuel is reprocessed and separated plutonium enters commercial traffic. The task force recommended spent fuel storage and disposal "until such time as the need for plutonium fuel is clearly established, the threat of terrorism has lessened, and the adequacy of safeguards and physical-protection systems has improved." The task force members included Stanfield Turner, former director of the Central Intelligence Agency, and

several figures prominent in the nuclear enterprise, including Harold Agnew, former director of Los Alamos National Laboratory, and Bertram Wolfe, general manager of General Electric's nuclear fuel division. *Report of the International Task Force on Prevention of Nuclear Terrorism* (Washington, D.C.: Nuclear Control Institute, June 25, 1986).

2. At the time of this writing in late 1986 the guidelines litigation is pending.
3. Booth Gardner, testimony before the House Energy and Commerce Committee's Subcommittee on Energy and Power, Aug. 1, 1985.
4. Board on Radioactive Waste Management, letter to Ben C. Rusche (director, DOE Office of Civilian Radioactive Waste Management), Oct. 10, 1985.
5. U.S. Department of Energy, "Recommendation by the Secretary of Energy of Candidate Sites for Site Characterization for the First Radioactive Waste Repository" (DOE/S-0048), May 1986.
6. U.S. Geological Survey, memorandum on the draft environmental assessments, March 6, 1985. DOE's claims as to the adequacy of the Hanford site rest on standard sensitivity analyses using a wide range of assumptions regarding the critical variables of velocity and volume of groundwater flow.
7. Marilyn Meigs, aide to Sen. James A. McClure, chairman of the Energy and Natural Resources Committee and a senior member of the Committee on Appropriations, interview with the author, Oct. 15, 1986.
8. Ben Rusche, interview with the author, July 3, 1986.
9. DOE Crystalline Rock Program Office (Chicago), "Crystalline Options," May 13, 1986.
10. Letter to Secretary of Energy John S. Herrington from the chairman of three of the responsible Senate and House committees: Sen. James A. McClure, Energy and Natural Resources; Sen. Alan K. Simpson, Environment and Public Works; Rep. Morris K. Udall, Interior and Insular Affairs; and other members, June 11, 1986.
11. Comptroller General of the United States, opinion issued in response to a request for a review of the suspension by Sen. Lloyd Bentsen, Sen. Alan K. Simpson, and Rep. Edward J. Markey, Sept. 12, 1986.
12. Sen. Slade Gorton, testimony before the Subcommittee on Energy Research and Development of the Senate Energy and Natural Resources Committee, June 16, 1986.
13. Because of the general decline of potash mining in the region, local leaders do not regard the presence of potash at the site as a significant conflict.
14. See Elizabeth Peelle, "Innovative Process and Inventive Solutions: A Case Study of Local Public Acceptance of a Proposed Nuclear Waste Packaging Facility" (paper prepared for the National Forum on Managing Land Use, René Dubos Center for Human Environment, New York, Apr. 3–4, 1986).
15. Swedish Nuclear Fuel Supply Co., Division KSB, *Final Storage of Spent Nuclear Fuel-KBS-3, Vol. III Barriers* (Stockholm: May 1983) p. 10: 15, table 10-3. A National Academy of Sciences (NAS) panel has concluded that the claims made for the durability of the proposed canister are warranted by the Swedish evidence. Frank Press, president of NAS, letter to Birgitta Dahl, Energy Ministry, Ministry of Industry, Stockholm, Mar. 1, 1984.
16. The congressional Office of Technology Assessment has also suggested using a fully redundant waste package with a design life exceeding regulatory requirements. See Office of Technology Assessment, *Managing the Nation's Commercial High-Level Waste* (Washington, D.C.: U.S. Congress, 1985).
17. Currently, DOE intends for NAS to establish panels to oversee various aspects of the planned site characterizations in Nevada, Texas, and Washington. (Ben C. Rusche, letter to Frank Press, July 25, 1986.) But the academy can give better advice if free from the constraints of a program that is demonstrably unworkable.
18. Data have been compiled and analyzed on how 80 different underground facilities were affected by some 70 major earthquakes in North and South America, Japan, India, and the Mediterranean. Damage was slight at depths down to 900 meters, and was least between 200 to 900 meters (a Yucca Mountain repository could be at a depth of between 300 and 400 meters). See H. R. Pratt, "Earthquake Damage to Underground Facilities and Earthquake Related Displacement Fields," *Proceedings of the Workshop on Seismic Performance of Underground Facilities* (Aiken, S.C.: Savannah River Laboratory, 1981), 74 and 370.
19. M. S. Bedinger, K. A. Sargent, and J. E. Reed, *Geologic and Hydrologic Characterization and Evaluation of the Basin and Range Province Relative to the Disposal of High Level Radioactive Waste*, U.S. Geological Survey Circular 904-4 (Washington, D.C.: USGS, 1984).

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RICHARD H. BRYAN
Governor

STATE OF NEVADA

ROBERT R. LOUX
Executive Director

AGENCY FOR NUCLEAR PROJECTS
NUCLEAR WASTE PROJECT OFFICE
Capitol Complex
Carson City, Nevada 89710
(702) 885-3744

December 29, 1986

Mr. Leslie Roberts, Senior Editor
Issues in Science and Technology
National Academy of Sciences
2101 Constitution Avenue
Washington, D.C. 20418

Dear Mr. Roberts:

Governor Bryan asked me to respond to your invitation to comment on Luther Carter's article, Nuclear Imperatives and Public Trust: Dealing with Radioactive Waste, published in the winter edition of Issues in Science and Technology, the science policy journal of the National Academy of Sciences. Mr. Carter argues that the national program for a high-level nuclear waste repository is in deep legal and political trouble, and may have to be abandoned. He proposes that Yucca Mountain in southern Nevada be investigated as the primary repository site as a way of solving the problem.

I agree with a number of Mr. Carter's findings and early conclusions, but vehemently disagree with Mr. Carter's leap of logic reflected in his final conclusion. For instance, I agree that, "politics was definitely a major consideration in looking for sites on the Nevada Test Site and on the federally-owned Hanford reservation in Washington State," and that, "while the [Nuclear] Waste [Policy] Act called for `consultation and cooperation' between the DOE and potential host states, the candidate sites had essentially been selected before the Act was passed."

Mr. Carter's conclusion, however, betrays a disturbing ignorance of the serious technical concerns that have surfaced at Yucca Mountain--as well as at the other two prime sites identified by the U.S. Department of Energy (DOE). In addition, Mr. Carter's proposed "solution" to the quagmire created by DOE's ineptitude in implementation the Nuclear Waste Policy Act (NWPA) is simplistic and naive and flies in the face of Congress' intent that nuclear waste repositories be sited on the basis of sound technical and scientific investigations, not political expediency.

Mr. Carter's treatment of the subject lacks internal consistency in that he spends considerable time (over half the article) systematically describing how DOE has so mismanaged the high-level nuclear waste disposal program as to bring the entire effort to the point of collapse. He then proceeds to turn the smoking gun on himself--and the rest of us--by suggesting that the way to salvage the program is to, essentially, ratify and endorse DOE's bungling by arbitrarily focusing attention on one of the three sites selected, perhaps illegally, under DOE's admittedly flawed and technically inadequate siting process.

At best, Mr. Carter's proposed 'fix' is reflective of a seriously incomplete understanding of the problems confronting the nation's efforts to find a permanent solution to the nuclear waste dilemma. At worst, it can be seen as indicative of a disturbing disregard for the principles of scientific objectivity and an implied acceptance of national nuclear waste policy--making which is governed solely by the exigencies of short-term parochial political expediency. Mr. Carter's logic is akin to asking Congress to legalize arms sales to terrorists simply because it is easier to do that than it is to stop terrorism in the first place.

Mr. Carter's proposed solution for putting the nation's nuclear waste program back on track does great disservice not only to Congress--which struggled long and hard to fashion an equitable and technically justifiable framework for waste disposal--but also to the citizens of this country, regardless of where they reside. His contempt for the type of citizen involvement and democratic decision-making which Congress so carefully institutionalized in the Nuclear Waste Policy Act is evident throughout the article.

In conclusion, it must be emphasized that the problems now plaguing the nuclear waste program are not, as Mr. Carter would have us believe the result of failed national policy and approach as set forth in the NWPA of 1982. The problems are, rather, the direct result of the U.S. Department of Energy's blatant and illegal disregard for the provisions of that law. The answer to the current state of affairs does not lie with the endorsement of DOE's mismanagement by arbitrarily identifying Yucca Mountain as a political scapegoat, but in a return to a truly national site screening program aimed at finding the best possible repository location.

If there is one fact that has been demonstrated clearly, it is that the Department of Energy is incapable of effectively managing the nation's nuclear waste program. Mr. Carter could have done the country a valuable service had he attempted to focus attention on the cause of the problem rather than seeking to make all of us accomplices in a failed endeavor.

Sincerely,

Robert R.

Robert R. Loux
Executive Director

RRL/gjb

cc: Governor Richard Bryan

Mr. RUSCHE. Mr. Chairman, these factors and many others were examined in our look through the environment assessments. They are, by themselves, that is, their existence is certainly no cause to suspect that a site is unqualified or disqualified. We found that our best knowledge of such parameters leads us to believe it is a worthwhile investment, to go through site characterization, to investigate them specifically. And that is why we chose Hanford.

The CHAIRMAN. These are negative factors, are they not?

Mr. RUSCHE. Not necessarily. A complex geo-hydrologic regime, if understood and if behaving as we think it will, might well be a positive factor. It might well be a barrier to movement of such materials in the limit to the environment. The fact that it is near the Columbia River is certainly a factor that has to be taken into account, but under the EPA guidelines, whether the Columbia River is there or not, we are obligated to meet objectives that have been established by both that body and the NRC. Certainly, protecting the river is one of those objectives.

The CHAIRMAN. According to the article, the total estimated cost for the Hanford site was $12 billion in 1985 dollars, $4 billion more than at the Richton site in Mississippi, and $5.4 billion more than in Nevada.

Are these estimates correct?

Mr. RUSCHE. I think they are about correct.

The CHAIRMAN. What is the degree of uncertainty in estimates, plus or minus? I think one article used 35 percent plus or minus.

Mr. RUSCHE. Mr. Chairman, the 35 percent number that you have seen is purely a traditional engineering uncertainty attached to estimates made in this context. Please let me convey we do the best we can with estimates. We do not even have a design for the sites based on in situ information. So the fact or the likelihood that we will find information that will alter the cost of these sites, materially, is quite high. We will have to do the best we can, and these are the best that we can do, but I would certainly urge us all to keep in mind that the purpose of characterization is to uncover information that will allow us to improve those estimates.

The CHAIRMAN. According to this same article, drilling at Hanford will require 15-diameter shafts, 3,000-feet deep, "a fete beyond the demonstrated state of the art."

Is that true?

Mr. RUSCHE. I am not sure whether the quote is true or not, but given the information you have just given me, that is not a true statement. We expect to have a 6-foot shaft and a 12-foot shaft at the Hanford, and we expect the technology that is required, or the technology that is required to drill such shaft is not only demonstrable, but we have the drill rig in place and the tooling in place to do it.

The CHAIRMAN. Opposition to the bedded salt site in Texas seems based on the fact to the repository would pass through the Ogallala aquifer. Why isn't this a disqualifying factor for the Texas site?

Mr. RUSCHE. Our objective, of course, is to find a way to get to the horizon of interest, and not affect adversely such an aquifer. There are not very many places in the country, even in Senator McClure's Idaho, that are not over an aquifer, even though the surface may be desert-like. So the fact that an aquifer is there only requires that we give it very special attention, to be sure that it is not adversely affected.

The fact that we penetrate the aquifer, is true in petroleum drilling, in mining, time and time again, and there is great experience with respect to sealing such aquifers. The site characterization program and the drilling of exploratory shafts has as one of its major objectives, providing convincing evidence that we can indeed penetrate and seal without adversely affecting that aquifer.

The CHAIRMAN. Witnesses from Nevada have stressed that Yucca Mountain is near the Nevada Test Site and very little is know about the affect of nuclear weapons testing on the tuff formation under the mountain that would be host for the repository. What do you say about that?

Mr. RUSCHE. It certainly is a factor. We have been testing weapons in that environment for decades. We do have quite a bit of information about the disbursion of energy from such a test. In fact, I have provided Senator Hecht and others, and the public, copies of data that provided the basis in the environmental assessment that lead us to conclude that it would not be an unnacceptable situation.

Nevertheless, we would not discount it and we are going to give special attention, partly at Senator Hecht's request and his insistence, to both seizmic and tectonic affects which will include the impact, or the interaction between that site and the testing on the site.

The CHAIRMAN. Would you tell us why it is necessary to characterize three sites simultaneously, and I say that with the background of the fact that when we passed this Bill, the figure we were given was that characterization would cost about $60 million per site. Now that is going up to about $1 billion per site, and I know it would be nice to do the three simultaneously, if the dollars are less, but would it be totally imprudent to try to pick our best site based upon what we know about it, and go ahead with characterization of that site and hold the other two? Can you speak to that?

Mr. RUSCHE. Senator, based on the discussions we have had over the last week or two, I think it would be imprudent for me to make such a suggestion, and that the Act requires us to characterize three.

The CHAIRMAN. I know the Act requires it. I am talking about amending the Act now. We want you to follow the Act, including the second repository.

Mr. RUSCHE. I have been made sensitive to the interests of all of us.

The CHAIRMAN. It may be premature to make a judgment on that. If it is, just tell us what you think.

Mr. RUSCHE. I think it would be premature to make a judgment. I think we have not had enough experience in subsurface investigation at this scale to allow us to make a judgment that would be of high confidence on a single site. Now, if the Congress were to be of a mind to relax its schedule, that is, to accept the thought that if the first site is not acceptable after ten years, then we take the second site, and take ten more years, thereby extending perhaps 20 or 30 years into the future the operation of the repository, that would be a way to approach the subject.

I interpret the law that was passed by the Congress to carry with it an inference that it was important to proceed, and one of the values in proceeding with three sites simultaneously, is to increase by a considerable factor the likelihood that one of the sites will be found acceptable.

It is in that context that I would still favor characterizing three sites instead of one.

The CHAIRMAN. Mr. Rusche, I have a number of questions which I will submit in writing. I must go to the Senate Floor at this point. Let me ask Senator Fowler, if he can be here, if he will preside at this point?

Senator FOWLER. I will be delighted.

The CHAIRMAN. Thank you, very much, Mr. Rusche.

Mr. RUSCHE. Thank you, sir.

Senator EVANS. Mr. Chairman, can we find out what is going on the Floor. We have a live quorum, and I think it is on the Appliance bill.

The CHAIRMAN. Yes, the appliance bill.

Senator MCCLURE. Mr. Chairman.

Senator FOWLER [presiding]. Senator McClure.

Senator MCCLURE. Mr. Rusche, there were a number of suggestions made by witnesses, both yesterday, and others who are observing this program that you haven't really attempted to nor achieved any kind of realistic consultation.

In that context, they have suggested that you break the negotiations for such C&C agreements into small pieces, and thus make some progress on some parts of it. Is that a useful suggestion?

Mr. RUSCHE. Indeed, Senator, I think it is. In fact, in our communications with the affected States and Tribes, we have offered to try to reach agreement on individual items which would be less than normally expected for the full scope of C&C, and I welcome the suggestion that some might have made to that effect. We would welcome it.

Senator MCCLURE. How much of the interaction between your program and the States and Tribes is done by contractors as you compared to your in-house personnel?

Mr. RUSCHE. I believe it is fair to say that the bulk of the interaction is done by Federal personnel, members of my Staff. We use contractors, of course, to provide the technical input, but I believe the direct interactions are largely with Federal personnel.

In fact, the meetings I referred to next week, the quarterly meeting, I expect I will have 12 or 15 members of my headquarters staff, to say nothing of local project staffs, who will be present in that meeting in Spokane.

Senator MCCLURE. I wonder if you could make inquiry of the affected States and Tribal officials, whether or not some of their reaction comes from contact they have had with contractors, rather than Federal personnel.

Mr. RUSCHE. I would be glad to make the inquiry. I have had no such feedback to that effect, but that may mean I have not had my ear close enough to the ground.

Senator McClure. In your ranking methodology—excuse me. Let me back up and say it a different way. In justifying your decision to indefinitely postpone the second repository work and in justifying your decision not to move some of the defense waste on the Hanford Reservation, you cite costs as one of your major reasons.

Yet, in your ranking methodology, you chose to ignore a cost factor that is many times larger than the cost factors just referred to. Can you tell me why?

Mr. Rusche. Senator, the cost factor that was utilized in the multi-attribute utility analysis, which you refer to with respect to our ranking, is characterized by the comment I made a moment ago on costs to Senator Johnston. Those costs are the very best that we can do at this time, but we do not have anything like construction quality or construction confidence in those estimates.

It seemed to us that issues about which we could have more specific information and more confident information related to health and safety, socio-economic, environmental effects, upon which we do have confident information, and which will affect the potential ability of the site to serve its purpose, ought to be given greater weight.

For that reason, that is the uncertainty in these costs—let me just cite two examples, if I can, as to uncertainty. The repository cost estimates show that the cost difference between a salt site and a basalt site, such as the Hanford site, is about $3.5 billion, as I recall. That assumes that we will not have difficulty in maintaining retrievability if we were to use the salt site. We are gaining information from the experience at WIPP and from salt sites around the world, particularly in Germany, as to the interest and difficulty in addressing the subject of salt closure.

If we were required to maintain access to that salt site, as fully as might be the case, the cost of that salt site might go up by a substantial amount. We would not know the answer to that question until we get into characterization.

The high cost of the Hanford site, at the other end of the spectrum, is projected because of an expectation that dealing with hard rock and high temperatures which are likely to be present in the site, not beyond technology by any means, but certainly factors that have to be considered, are likely to increase the number of people required, the amount of time required, and in effect the long time to hold that site open before we were to close it 50 years in the future adds much to the cost of that estimate.

If we got there and found that that was not the case, the two cost estimates might completely flip. For that reason, we concluded it was just not appropriate to give the same weight to such imprecise cost estimates, even though they are the best that we can get at this time, and rather focus our attention on the issues that I mentioned.

Senator McClure. The States have indicated that they feel you have not been responsive in granting them money to participate in the process. Why did it take so long for Nevada to receive its requested grant money, even after the lawsuit was decided in their favor?

Mr. Rusche. The lawsuit to which you refer provided a set of criteria against which we were directed by the Court to evaluate grant requests for appropriateness, and much of the time was involved in addressing the issues that were raised and getting a satisfactory exchange of information between us and the State.

There is an element of fiduciary responsibility that is required and we will try to move as quickly as we can. I believe Senator Hecht announced yesterday that we have reached agreement on the current grant request, on a larger portion, and are working to finalize that grant as quickly as we can.

Senator McCLURE. I understand that. I understand you do have a responsibility. I would be the last one in the world to suggest you waste money, even though you have it. But the other side of that is, if you know you are going to make a grant, why does it take so long to make a decision?

Mr. RUSCHE. Because the elements of the grant, we are required by the action of the Court, to evaluate against certain standards. That requires us, we believe, to have certain information available. Obviously, the amount of information and the quality of the information is a subject of discussion, and we have attempted to react as promptly as we can.

Senator McCLURE. Well, the delay gives them the impression that you do not desire to make the grants, that you are trying to frustrate the process, and while you can assure us that you are doing it as fast as you can, I think you recognize it is feeding their suspicion.

Mr. RUSCHE. Indeed, I do, Senator. In fact, I have had the same comments made to me, so it is not a new comment. I would note, however, in the case of the Nevada situation, that at no time has their program been impeded by the lack of fund availability. We granted, in the circumstance you describe, a no-cost increase to allow the State to expend unexpended funds previously granted, that is, granted for other purposes, but not expended, and I believe we have provided the funds on a basis that did not impede or prevent them from doing the work that they intended to do.

Senator McCLURE. What do you intend to do with Governor Gardener's request to organize a non-binding conflict resolution process?

Mr. RUSCHE. Senator, that could warrant some considerable discussion. At the risk of being very brief, let me suggest, as Secretary Herrington said last week, I think there are elements in the Governor's letter that are very constructive and I appreciate the tone of the letter. But the idea of trying to put in place a national forum or a national process to resolve issues of this sort, to me, is not realistic. I think we have come to the one forum that can resolve the issue, namely the Congress.

I think it would be very difficult to have EPA and NRC, who are independent and autonomous regulatory bodies, subject themselves or agree to participate in such a forum; that we ought to try to resolve our differences is without question and an objective we want, both, to follow.

That negotiated rulemakings, or negotiated proceedings using third parties might be helpful, I certainly agree it is worth trying, and we will try. But I do not believe that the kind of national forum that the Governor suggested will serve our purpose. We will try to communicate that in a manner that will allow us to get what we can out of the proposal, but I am not sure the Congress would be bound by the output.

Senator McCLURE. I am not sure the Governor suggested that anyone would be bound by the output, but it might be a means by which there was a discussion to a resolution.

Mr. RUSCHE. My reading of the letter suggests that the parties to participate would entertain their participation in the context of trying to reach a conclusion.

Senator McCLURE. Well, in the context of trying to, but I understand it to be a non-binding process.

Mr. RUSCHE. I think we need a binding process, though, sir.

Senator McCLURE. That may well be true, but people will never feel they have been consulted if, as a matter of fact, they have not been.

Mr. RUSCHE. We believe there has been a large measure of consultation going on, although I recognize there is a difference of view on the subject. We will try.

Senator McCLURE. My time has expired. I have a number of other questions to submit for response in writing. Thank you, Mr. Chairman.

Senator FOWLER. The Chair will yield his time to the Gentleman from Tennessee, Mr. Sasser.

Senator SASSER. I thank you, Mr. Chairman.

Mr. Rusche, it has been clear from the beginning that one of the reasons the Department of Energy chose Oak Ridge, Tennessee as the site for the Monitored Retrievable Site, was because of the expectation that the community would be receptive to this project.

You said as much in one of your early draft plans. I want to suggest to you this morning, Mr. Rusche, that community support for the MRS has been badly eroded, and not the least because of what I perceive to be clumsy efforts on the part of the Department of Energy to impose a Monitored Retrievable Storage site on the State of Tennessee.

Now there is a newspaper in Oak Ridge, the Oak Ridger, which initially supported the location of an MRS in Oak Ridge, Tennessee. Let me just read to you some excerpts from an editorial from this newspaper that appeared just this week.

It begins by saying:

> The Oak Ridger supported having the MRS here.

If you will note, that is in the past tense. It goes on to say,

> The Reagan Administration had its chance to sell Tennessee on the MRS concept. At the time, we had a Republican Governor, but the Administration couldn't convince the Governor, despite the best efforts of Oak Ridge.
>
> Few Tennesseans outside of Oak Ridge had a kind word to say about the MRS. Now it is no longer a question of whether Oak Ridge is for the MRS, the issue is much larger than MRS. We can no longer have any affect on it. There are many issues, including the problem of establishing a permanent repository. Every State on the list opposes being home to the repository. There is the issue of whether Mr. Herrington was even correct legally in deferring consideration of a second repository site which was to have been in the Eastern United States.
>
> The question comes, why all three of the sites chosen by the Department of Energy for the MRS are in Tennessee, is yet another issue that has come up. Whether or not an MRS is needed at all is now an issue, one which will ultimately have to be decided by the Congress.

It goes on to say that:

The Department of Energy's acknowledgment that it can't meet the deadline for a permanent repository for spent nulcear fuel, its proposal for a five-year delay in opening a permanent repository, its opinion that this makes the MRS even more necessary as a depot at which fuel can be stored temporarily, causes MRS foes to nod their heads knowingly and say, "I told you so." So, DOE's credibility suffered another blow.

Now I would submit to you, Mr. Rusche, that there is not even support in the City of Oak Ridge of any substantial amount for the location of the MRS at that site. I think that bears out something that I said last week, when you appeared here with the Secretary of Energy, Mr. Herrington; that this whole effort to try to sell the MRS to a site, or select a site that would be receptive to the MRS, convinced the populous of that State that it was the thing to do has failed.

It has been botched. Let me ask you this question, Mr. Rusche, it is my understanding that the Department of Energy is designing an MRS facility that can be expanded from containing 15,000 metric tons of spent fuel, up to 70,000 tons of spent fuel; is that not correct?

Mr. RUSCHE. The design of the MRS which would be in the proposal is a flexible design that could be expanded to any size that available land would permit.

Senator SASSER. I see. We presently have about 10,000 of nuclear waste on hand. Is that an accurate statement?

Mr. RUSCHE. A little bit more.

Senator SASSER. So we could take the nuclear waste that we presently have, store it in the MRS, it would hold all of it, and then we have the potential to expand the MRS up to 70,000 metric tons of spent fuel.

Now, my question, Mr. Rusche, how can you characterize a facility that would be capable upon expansion of holding 70,000 tons of spent fuel as simply an interim repository? It takes on all the characteristics of a permanent repository if it could be expanded up to 70,000 tons, and if indeed that is done.

Mr. RUSCHE. Senator, the proposal that we hope to be able to present to the Congress when the litigation matter is finally resolved, contains as it did contain in its review form, which you have had an opportunity to read, a proposal to the Congress that there be a linkage made between the capacity of the MRS and the operation of the MRS, and the repository.

You rightly stated that it is the Congress who will make the decision as to whether there should be an MRS and where it should be. It is not the director, nor the program, and our proposal to Congress would be such that the kind of scenario you have painted would not be legally workable.

The proposal would state that the capacity of the MRS be statutorily limited to 15,000 metric tons, and that the MRS not be allowed to operate until, by connecting it with the licensing process of the repository, we had confidence that a repository would be operating.

Now if the Congress chose to establish conditions, such as you outline, then if I were the director, it would be possible to imagine such circumstances, but under the provisions that we have talked about so far, your scenario is just not possible.

Senator SASSER. Well, Mr. Rusche, any statute that Congress makes can be changed. I think we can agree to that. And, if we are sitting here with a repository that holds 15,000 tons of spent fuel, you have 10,000 tons of spent fuel presently on hand that you want to put into that repository, you see the repository filling up, you can't get permission to put a permanent repository anywhere else, it is just as clear to me as the nose on my face that the Department of Energy, your successors are going to come back to this Congress, and you are going to say:

> Ladies and gentlemen, we have the capacity to expand this MRS up to 70,000 tons of spent fuel.
>
> That 70,000 ton capacity will meet our spent fuel requirements for decades to come and we suggest we go ahead and expand the MRS because it is already there. The people of Oak Ridge and the people of Tennessee already have the nuclear waste. We don't have to fight that battle anywhere else; let's just expand the MRS up to 70,000 tons and put that spent fuel in there.

That is the path of least resistance. I think that what your successors in the Department of Energy will propose, and I strongly suspect that that is what any successive Congress would go along with.

My point is, if we put in this MRS in Tennessee with a capacity to expand it up to 70,000 tons, I want to say that in my view what we are creating there is a de facto permanent repository, and we are going to have that permanent repository, right there, concentrated in an area of very heavy population, an area that has been growing substantially in population and will continue to grow in years to come.

Mr. RUSCHE. Senator, please excuse me, but I can't predict what my successors might do.

Senator SASSER. That is precisely the point, Mr. Rusche.

Mr. RUSCHE. And I certainly can't predict what Congress might do, but I do have faith that this Congress, and its successors, would exercise judgment should such a proposal be presented to it, and in the same sense that I interpret the law that you have passed now, to be a right and proper course for America in disposing of nuclear waste, I would have confidence that that future Congress would make the choice that was right for America.

I don't know any other way that America can make choices. Your speculation is certainly not without——

Senator SASSER. If I could submit, Mr. Rusche, the law has already stated how this choice is to be made. The choice is to be made with selecting a permanent repository and now we are letting that whole timetable slip and we are going to try go ahead with an MRS, and push the permanent repository off into the future.

I just submit that once this MRS is built, with the capacity to expand it, with no permanent repository having been selected, construction not having been started on it, then the MRS is going to be the de facto permanent repository.

Senator FOWLER. The Gentleman from Tennessee and I have to go vote, Mr. Rusche. We thank you for your testimony and in a display of bipartisan unity, I am going to leave the Chair in the capable hands of the gentleman from Nevada. The only caveat, that permanent site selection will not occur in our absence.

Mr. RUSCHE. Did you say not occur, or not in Georgia?

Senator FOWLER. No. I have the national interests at heart.

The gentleman from Nevada, Mr. Hecht.

Senator HECHT [presiding]. Thank you, very much. When I get up to speak, everyone leaves. Anything personal between us that needs to be addressed happened, Ben?

Mr. RUSCHE. It is just you and I, Senator.

Senator HECHT. Ben, what is the difficulty in getting the grant issue resolved in the State of Nevada?

Mr. RUSCHE. Senator, to the best of my knowledge, the items that are yet to be addressed have to do with a part of the request that relates to hydrology studies, geology studies and socio-economic studies, as well as I believe some legal studies.

As you noted yesterday, of the $10.25 million Nevada grant, the Department has reached agreement and made the grant of about $6.7 million. The remaining $3.5 involves the items that I just mentioned. I hope that is going to be resolved momentarily.

Senator HECHT. I announced that yesterday morning. Either you or one of your staff called my staff and I announced that to Governor Sawyer when he was here yesterday.

Mr. RUSCHE. I understand that was the case. I got the word from you before I did from them, and I think that is an indication of our close communication.

Senator HECHT. Well, someone in your office is working, right?

Mr. RUSCHE. I believe that is so. Let me note one thing, if I can. Among the more difficult considerations in managing the program, not only me personally but I think the field offices like the Nevada Office, is trying to deal fairly and promptly with grant requests. You recall, the Nevada State activity litigated the issue and the Court ruled in favor of the Nevada premise, and provided extensive guidelines for us to use which have become a part of our financial assistance program.

Now, I think if you wanted to get into a lot of detail, I could go back and point out that there have been some adjustments in the Nevada grant in relatively short times, compared to the budget cycle. For example, I believe the original—let me just say, I believe our expected magnitude of the 1987 request was only about $5.6 million.

Just after you, the Congress, adopted the continuing resolution, that request was modified to $10.25 million, and as much as I would like to say that I am autonomous, or the folks in Nevada are autonomous, that just is not so. In the Federal Government we just have to follow a number of procurement procedures, and so forth. And I would plead for our friends in Nevada, that they, if not agree, at least understand and we will continue to work the issue as promptly as we can.

Senator HECHT. Did I see Bob Loux in the audience? Would you mind walking up and sitting in this chair, Bob. I just want to verify some of the things. I didn't know whether you went back with Governor Sawyer or not.

I will take the prerogative of the Chair.

You have asked for $10 million; is that correct?

Mr. LOUX. Yes.

Senator HECHT. And you are aware that you will get $6.7 million immediately?

Mr. LOUX. I just heard that as a result of your comment yesterday. I have had no official word from the Department.

Senator HECHT. Can you give him the official word? Here is a pen. Do you want to write him out a check?

Mr. RUSCHE. Senator, I think you may be going beyond the bounds of the Chairman.

Senator HECHT. Okay, so you are waiting for $3.5 million; is that correct?

Mr. LOUX. I don't know what the exact numbers are. I have no idea at this point. You know more than I, other than our request has been pending since October, with not one piece of correspondence in the interim as to what the disposition would be, until I heard yesterday.

And contrary to the point made earlier, we have contractors who at this point are contemplating bailing out on us because we cannot maintain a contractual relationship due to the infrequent funding that the Department provides.

Senator HECHT. Ben just said the check is in the mail.

When will this be funded; immediately?

Mr. RUSCHE. I believe the funds will be available very shortly. The action is taken in the Operations Office and I believe that that has essentially be settled.

Senator HECHT. Okay. Then the other points that you mentioned, are you aware of those Bob?

Mr. LOUX. I have not——

Senator HECHT. Go over those, again; what the hang up was on the other $3 million.

Mr. RUSCHE. I indicated that there were three or four issues in the $3.5 million remaining which are yet to have adequate information provided, and I believe Mr. Vieth, who is the project manager, and the folks in the Nevada Office have had verbal discussions with Mr. Loux. He may well be right in that there have not been a flurry of letter writings back and forth on the subject.

Those subjects have to do with the hydrology studies, geology studies, socio-economic studies, legal services. I believe in the $3.5 million, there has been agreement at least within the Department, and I think with Mr. Loux' awareness, that a small item having to do with environmental studies review is premature, in the amount of about $175,000 and therefore is not appropriate in this request.

Senator HECHT. Do you have anything you want to add to that, Mr. Loux?

Mr. LOUX. Yes, Senator, as you recall yesterday, you made a very lengthy and I thought accurate plea for comment and discussion based on facts rather than other factors, as you called them.

Senator HECHT. As did Governor Grant Sawyer.

Mr. LOUX. Absolutely, and that is precisely my concern; that the money that the Department apparently is not going to come forward with is exactly the money that would provide us with the ability to garner those facts for you and for the State of Nevada. Although I am happy to receive salary money and money to be able to operate our office, it is the money that we are talking about, precisely here in hydrology and geology, which will get to the heart of the issue of whether the site is suitable or not. And it is the money that I am most concerned about.

Mr. RUSCHE. Senator, I don't know whether you intend this to be a negotiating session or not, but I think Mr. Loux recognizes that——

Senator HECHT. I am the fill-in act when everyone else is gone voting. But I just took the opportunity, as I had someone from the State who is in charge of this program, to help resolve some of these issues publicly.

Mr. RUSCHE. Almost a public mediator, of sorts.

Senator HECHT. Well, I do represent the State of Nevada and we happen to have the man here who is running the State's program.

Mr. RUSCHE. I am not trying to be flip about the matter. It is an important issue. I think we understand, the folks in the Nevada field office understand the importance to Nevada and to the program, of the work that is intended.

I can assure you, and Bob, that the issue will be addressed, but it does take participation by both parties and there are pieces of information that are required for evaluation and confirmation, and as those are being worked, the issue will be resolved, I can assure you.

Senator HECHT. Bob, I thank you for coming up. If you will do this in the future, just stay in contact with my office, like you have been, and I will be in contact with Mr. Rusche's office and we will get these items resolved.

Thank you. You can sit back there, again. Thank you, very much, for walking up.

Ben, to be fair to Texas, Washington and Nevada, don't you think the site characterization work should start at the same time and end at the same time for all three sites?

Mr. RUSCHE. Senator, I don't believe it is a question of fairness. From the standpoint of management of the program, each of the characterization activities, in particular the exploratory shaft work, is on the critical path to an evaluation of the site, and if we were confident, supremely confident of the outcome of the discussion, one might attempt to start them at the same time.

But our ability to predict within a few weeks or a month or two as to how long it is going to take is not very good. We are doing exploratory work. We can't tell for sure how long it is going to take to conduct the in situ test program. We may find conditions present not anticipated. It may take longer than we had guessed, and it may take less than we guess.

I think the bottom line that I come to and I think a prudent manager would come to is that we should start each one of them as early as we can, and our predictions, as you well state, show that they will not end at the same time.

We will need the information for the preparation of the EIS, but to suggest that we would delay getting the information, I think would be imprudent and unwise and, therefore, we have scheduled the program as you have suggested.

Senator HECHT. Which are the different starting times and different finishing times?

Mr. RUSCHE. Starting as soon as we can at each site and proceeding as rapidly as we can to get through the characterization process.

Senator HECHT. Just state publicly, what is the starting time for each of the three sites?

Mr. RUSCHE. I was trying to remember, right off the top of my head. Let me see if I can—the start of exploratory shaft construction, we estimate about the second quarter of calendar year 1988 for Nevada. It is found in Table 1 of the draft Mission Plan amendment, for reference purposes. Basalt, that is Hanford, in the third quarter, and salt in the fourth quarter of 1989.

Senator HECHT. That means the Nevada site would be finished about a year before the other two sites.

Mr. RUSCHE. The end of site characterization, if our projected plan is realized, would have the tuff site finishing in the first quarter of 1992, and the others in the first quarter of 1993, as you suggested, about a year earlier.

Senator HECHT. About a year earlier. Well, we will go into that in a little bit more detail.

Mr. RUSCHE. But I hope you can appreciate, it is not like we are taking a journey from here to New York and we all want to get to New York at the same time. We want to start toward New York, and we may find that in some cases we have to go to Pittsburgh, and in some cases we have to go to Philadelphia, and you can't really tell. So if you want to get to New York, it seems to me that the prudent course is to get started as soon as it is appropriate to start.

That is, we have the planning done, the criteria for evaluation in place, and that is what the site characterization plan does, and proceed as promptly as we can. That allows us the maximum opportunity for unexpected or unanticipated circumstances, and I think gives us the best chance for proceeding on the course.

You have heard others speak to me today about delaying the program and I have had some even tell me that they think I am running a train down the track. We have tried to find a prudent, management, sound, responsible position and I think this is one of those cases in which moving as soon as is practical is the right thing to do.

Senator HECHT. Well, there has been concern in my home State that if Nevada is found to be suitable, then work would stop on the other sites immediately. How would you address that?

Mr. RUSCHE. Unless the other two sites would have been found unqualified or unacceptable, that would not be the case. We are charged under the law to prepare an environmental statement, environmental impact statement, comparing the sites characterized as to their suitability and to provide a basis for the choice for the President's selection of one such site, and then for that same document to provide a basis for our construction authorization request to the Commission, and I think that is an unfounded concern.

We expect all three sites to be found qualified and until they are found disqualified, the work will continue on all three sites, and should that be the case, all three will be included in the environmental impact statement, as planned.

Senator HECHT. I just wanted to address that question publicly, and I wanted you to speak on it publicly. That was all.

Is it true that the NRC has never approved a cask design that DOE has submitted for casks to transport waste?

Mr. RUSCHE. I would have to think about that a minute. DOE's shipments for National security purposes, are not subject to NRC regulation. They have been certified by the Department to be equivalent to NRC specifications, and—could I ask one of my associates?

Senator HECHT. Of course.

Mr. RUSCHE. Roger, have we ever made an application to the NRC for DOE?

Mr. HILLEY. I do not think so, but we ship DOE material in an NRC certified cask, now.

Mr. RUSCHE. But I think the question was, have we ever submitted for certification a DOE Cask, and I believe Roger's conclusion is correct. That is not the procedure that is being followed now. When we get to shipping for the civilian waste program, the casks still may not be submitted for certification. They may be a contractor, but as Roger points out—the gentleman who spoke was Mr. Hilley, who is my Associate Director for Storage Systems and Transportation. We ship materials in NRC-certified casks very often. They have been certified as a result of other activities.

Senator HECHT. I appreciate your willingness to work with us, as far as the question of Yucca Mountain goes, or its earthquake fault line, and we might have an independent study ourselves, in addition to you as, but this has to be addressed and I am glad of your willingness to address it because there could be a lot of unanswered questions. One last question and I will let my colleague take over.

As our Chairman said, we are planning a trip to France and to Germany, and maybe Sweden—or two of these three counties, just to determine how they are handling their nuclear waste, and they seem to be very effective. Have you not considered the European method of handling waste, rather than the method which is prescribed in the Management Act?

Mr. RUSCHE. Of course, I am familiar with the programs in several of the other countries, because we have cooperative agreements with them. In Sweden, whose representatives you had an opportunity to hear some week or two ago, their program is very analogous to ours. They have an interim storage facility called CLAB now in operation; they have an intermediate storage facility outside the high-level waste arena under construction and they expect very early in 2000, that is, right after the turn of the century, to select a site for a geologic repository for permanent disposal. And in that sense, it is very analogous to ours.

The French and the British have not made final choices on sites for their permanent disposal, and have elected to store on an interim basis for some indefinite period, or let me say an intermediate period of 20 to 50 years or so. The Germans already have under construction their high-level repository at Gorleben; and when I look at the program that Congress mandated, I find no reason for thinking that our approach is not comparable to, but in my opinion, better in that the Congress made that final choice in the Act, namely that geologic disposal was the right, permanent disposal method for this country.

I think that was wise on the part of Congress, and I certainly would not advocate taking a different course.

Senator HECHT. I have a lot of questions that were submitted to me by some constituents in my State. May I submit them for the record, and you can have your staff address them?

Mr. RUSCHE. Yes, sir.

Senator HECHT. Senator Evans, it looks like you and I.

Senator EVANS. Thank you, very much. Unfortunately, we are getting ourselves into a thorough parliamentry tangle over on the Floor which we probably won't extricate ourselves from for most of the afternoon.

First, I hate to keep coming back to the same fundamentals, but I think that it is terribly important. I do not feel that either in Secretary Herrington's statement or in what I understand you have said so far, that either of you understand the law.

First, do you understand the distinction between doing, as you said, or as you referred to several times, what you wanted to do, starting from your confirmation hearing; you thought it was more important to do it right than to absolutely follow each of the time deadlines in the Act.

Do you understand the distinction between being unable to meet time deadlines because you need more technology, or more technological assessment or other elements, and deliberately deciding on your own that you want to delay a deadline that is encompassed in the Act?

Mr. RUSCHE. I believe I do.

Senator EVANS. Okay, there is a distinction, in other words?

Mr. RUSCHE. Certainly, and Mr. Chairman, if I may, I understood at my confirmation that I would be given the opportunity, or have the occasion at least once a year through the budgetary process to expose these kinds of ideas to the Congress for their consideration. We have done that.

Senator EVANS. There is a distinct difference, however, between asking Congress to make decisions, either by law or through the appropriations process, and deliberately making your own mind up and coming and informing Congress after you've done it.

Mr. RUSCHE. I think I understand your statement and I am not sure that I can add any more to what has been said, sir.

Senator EVANS. You are going to stiff me, just like the Secretary, in other words.

Mr. RUSCHE. I would never——

Senator EVANS. You will not answer the question.

Mr. RUSCHE. I do not intend to stiff you, Senator.

Senator EVANS Well, you know what the law says in the section referring to a second repository. How can you say that you have the authority or the discretion to decide on your own that for whatever purposes, you can simply delay the development of a second repository?

Mr. RUSCHE. There is obviously a difference in view between yourself and the Secretary and the Department. We thought that the course we took of making such a determination and bringing that determination for your review through a Mission Plan amendment was appropriate and I gather that you think it is not.

Senator EVANS. No. There is a distinct difference for our review. You are suggesting that if we do nothing, that that is acquiescence.

Mr. RUSCHE. No, sir. I am not.

Senator EVANS. Does that mean you are bringing this delay of the second repository to Congress and, unless we approve it, you will go back to the way the law reads?

Mr. RUSCHE. That is precisely what the Secretary said last week.

Senator EVANS. He certainly did not. In other words, you are prepared to proceed immediately on the second repository unless we, specifically by modifying the law, suggest that something else be done.

Mr. RUSCHE. We asked you for specific direction and we understand that specific direction will be forthcoming. That is the purpose of the amendment.

Senator EVANS. In other words, if the Congress does not pass any modification in the Nuclear Waste Policy Act, you will return immediately to the development of on the second repository. Is that correct?

Mr. RUSCHE. I believe that is the statement the Secretary made, and I would like to reserve to be sure, but I am confident that that is the case. I would only note that proceeding immediately carries with it certain connotations, and the funding that is now available has been provided under certain provisions as well.

Senator EVANS. I understand all of that.

Mr. RUSCHE. And that would have to be accommodated in the process.

Senator EVANS. I think that it is safe to say that a reading of the testimony of the Secretary last week will show that at least five of us on this Committee tried to get an explicit answer out of the Secretary and were unable to do so.

Mr. RUSCHE. Would you allow me to look at the testimony and see if I can provide a written answer on that subject for you?

Senator EVANS. And I think that I will also supply another written question to make it very explicit. The question I hope will be explicit enough so that it will only take a yes or no answer. I will try to craft one in that form.

Mr. RUSCHE. And we will try to respond, sir.

Senator EVANS. Secondly, on the whole question of consultation and cooperation, is it accurate to say that at least the State of Washington over a period of almost five years, or since the passage of the Act, has on a considerable number of occasions attempted to move forward and to reach a C&C agreement?

Mr. RUSCHE. That is correct, sir. In fact, I think you are aware that before the May 28th decision, we had I guess what I would call discretionary C&C negotiations—that is, not required under the Act, because they are required after selection for characterization. Prior to that time, the State of Washington had sought, and we had together, been working toward a C&C agreement and had after about six or eight months, as I recall, reached an understanding that there were two items that remained that we probably would not be able to resolve in that context. Those had to do with indemnification, and had to do with the Defense waste issue.

Save for those two, 18 months ago if you had asked me, I would have suspected that we were ready to sign a partial C&C agreement.

Senator EVANS. You were not in attendance yesterday, or at least I do not believe you were. There was extended testimony from all of the Indian Tribes States represented that they believe that they have tried. I do not accept the conclusion that you stated earlier, that it was the interest of States to delay and by continuing to delay and obstruct, to prevent you from doing what you want to do.

I think there is a deep concern and the deep concern ought to be alleviated. The only way you can alleviate it is to cooperate and consult. Consult does not mean laying out a full-fledged document, or a full-fledged idea or set of ideas, and then ask for it to be accepted by the other party.

In my view, the day you start true consultation and true cooperation is by sitting down with the States and with the Indian Tribes before the first pencil gets laid to a paper, and start building a consensus from the beginning.

Has any thought been given to approaching consultation and cooperation on that basis?

Mr. RUSCHE. Senator, I believe that some of the things we do tend to fit that pattern. While you were out, I think I referred to the fact that we have 12 coordinating groups that operate to bring the projects and the program into a manageable state.

Senator EVANS. I read about those.

Mr. RUSCHE. Those coordinating groups are somewhat of the type that you are talking about, or at least present the potential for that.

The closest thing I can point to that would fit that pattern specifically is a direct offer I made to representatives of the States and Tribes to consider the possibility of, in effect, joining my staff, as it were, and functioning as a part of the activity in a way like you are talking about, and I would think that there would be only one proviso that we would have to agree on if that were the case. And, that is, that when we reached a conclusion they would be a party to the conclusion, just like my staff is a party to conclusions that we reach.

There was interest in participation, but not interest in becoming a party to the activity. I think that is an endemic feature that we run into when you try to think of cooperation in that sort of pure state.

That the parties want to participate, but do not have the same objective in mind, and therefore, it is an activity that does not come to closure.

Senator EVANS. I do not believe that that necessarily has to be the case. Certainly, however, no one is going to participate on that basis if they believe that they have to be part of the conclusions if the conclusions are to be set forth by one party to the negotiation. Both parties have to agree with the conclusions, almost by definition. If they do, then you have an agreement, of course.

Mr. RUSCHE. If one of the parties is going to be in a position to veto, then I think that is inconsistent with both the authority and direction under the Act.

I could not operate in that environment. If that is the environment Congress wants us to operate it, this is another opportunity for direction from the Congress.

Senator EVANS. Well, we had considerable success in the implementation of the provisions of the Pacific Northwest Power Act of 1980 in doing just that; sitting down with those who were at each other's throats and had been for years. The Indian Tribes, utilities, fishery managers, were all arguing about a declining resource. We did sit down in a room and we did start from the beginning and we did get cooperation and we eventually reached an agreement. Substantial progress has been made since they in achieving the goals of the Act.

Mr. RUSCHE. But, Senator, isn't there a fundamental difference between that activity—I am not as aware of it as some, but I have spent some time in your State in two or three different instances, and I am aware of the work that you did as Governor and following. But it seems to me that the difference in that activity and the ones we are confronted with here is that the parties, even though they may have had different views about the subject, they wanted to see something done. They wanted conservation activities, the fishery activities to be carried out. The question was where and how much.

Senator EVANS. I do not think so. They sure did not start that way.

Mr. RUSCHE. Well, I have a different impression from the outside, but I appreciate your view.

Senator EVANS. No, and in fact, when the final fish and wildlife plan, for instance, was done, it was filed and there were no lawsuits whatsoever filed against it. Each party accepted it.

How many pending lawsuits are there currently with the Department?

Mr. RUSCHE. I believe there are 41, if I am not mistaken.

Senator EVANS. Let me proceed. The State has suggested a different style or different kind of conciliation. I thought the Governor made a remarkably good effort to try to lower the voices and try to get back on track. To my knowledge, he has not even received an answer from the Department in response to his letter. It has been well over a month.

Is there going to be an answer from the Department?

Mr. RUSCHE. Senator, I hope you will forgive me for answering like I feel compelled to answer, in the sense that we have not received the letter yet. Now, I have a copy of the letter. I met with the Governor on the 18th of December, in which he and Mr. Eschels, who was here yesterday, talked about the matter, and very soon thereafter—I believe the date of his letter is December 30th—we received copies of the letter from the press, and maybe even from your office, if I am not mistaken. We have not yet received a copy of the letter from the Governor.

Mr. Eschels is aware of that. Mr. Hussman is aware of it and that issue has been settled. Nevertheless, we have been addressing the matter. There will be an answer to it.

Senator EVANS. I would say, if you haven't received the letter, all it takes is a phone call to ask them to send it to you formally.

Mr. RUSCHE. We have been working on it. We have had some discussion.

Senator EVANS. It takes 30 days for a phone call?

Mr. RUSCHE. 30 days? No, we started working when we got it from the press.

Senator EVANS. In other words, it has not delayed you at all?

Mr. RUSCHE. It has not.

Senator EVANS. Okay, it has been more than 30 days and there has been no response.

Mr. RUSCHE. And there will be a response.

Senator EVANS. How long?

Mr. RUSCHE. I attempted to give a response while you were out, from someone else who asked me the question, and the kind of response I gave, again, was consistent with the Secretary's testimony of last week on the subject, which is that although there are a number of items that seem to have merit, I think the idea of a National forum to resolve issues that are identified, particularly siting issues and C&C issues, is a noble objective, but I doubt that the parties who are identified by the Governor and perhaps others not identified, could participate in that environment. We are prepared to try to work in that area, but I don't think a National forum, other than the Congress is going to settle the issue.

Senator EVANS. Well, it sure will not work if you go into it with the attitude that doesn't have a chance of working.

Mr. RUSCHE. Well, do you think the Congress might be able to settle it?

Senator EVANS. I am not quite sure whether we will because it doesn't seem to make much difference, in what Congress passes. You choose to follow which portions of the law you choose to follow. You decide unilaterally to delay a second repository. That is against the law.

I cannot get from either you or the Secretary any admission that that is so clearly the case. Five Senators asked the last time. They would all ask the same question today, if they were here.

Mr. RUSCHE. Sir, I believe I answered the question explicitly, and I believe the Secretary did, too. We will answer it in writing for you.

Senator EVANS. Let me just say in one final set of questions—I am not going to ask the questions, because I will ask them in writing—I have to go vote, again.

The investigative committee in the House did quite an analysis of the site selection process and I know they submitted a good many questions on that. Have those questions been answered?

Mr. RUSCHE. I have a letter to sign today that will present an answer to those questions in detail.

Senator EVANS. Would it be appropriate to have copies sent to us, or should we ask the House for that?

Mr. RUSCHE. Oh, no. We would be pleased to include you on the list and see that you get them in the next few days.

Senator EVANS. That may make the series of questions a little shorter, at least, I hope it will. It seems apparent that in the course of the travel of the recommendation report for the first repository from the analysts who did the report, to those who reviewed it and put it out, that there were very substantial changes—changes that it at least appears to be, were inappropriate, not scientific in nature. I am going to have to ask as many questions are necessary to find out why, under what circumstances, who and how those changes were made.

Mr. RUSCHE. We would be pleased to see your questions, but perhaps the answers that we have provided, which may or may not serve your needs, would be helpful. I will see that you get a copy within the next few days.

Senator EVANS. All right. Thank you. There will be, I am sure, a very long series of written questions from the various Members. But Members should submit questions for the record by close of business on Friday. We are going to have to go back and vote, and so without further business, we are adjourned.

Mr. RUSCHE. Thank you, Senator Evans.

[Whereupon, at 12:15 p.m., the hearing was adjourned, subject to the call of the Chair.]

APPENDIXES

Appendix I

Responses to Additional Committee Questions From the January 29, 1987 Hearing

POST-HEARING QUESTIONS AND ANSWERS
RELATING TO THE HEARING OF JANUARY 29, 1987

BEFORE THE

COMMITTEE ON ENERGY AND NATURAL RESOURCES
UNITED STATES SENATE

WITNESS: SECRETARY JOHN S. HERRINGTON

QUESTIONS FROM SENATOR JOHNSTON

QUESTION 1a: What are the circumstances under which DOE will make the amendments to the Mission Plan effective?

-- In your view is legislative action required to make these amendments effective or will the amendments become effective if no legislation is enacted by Congress?

-- When will DOE decide that Congress has not approved or is not likely to approve the amendments by legislation?

-- What will happen in the program in the meantime?

ANSWER: DOE expects to formally submit the Mission Plan Amendment to Congress this summer after the comment period for States, affected Indian Tribes and Federal agencies and others who chose to comment. DOE hopes Congress will act positively and promptly regarding the issues dealt with in the Mission Plan Amendment.

The schedules set forth in the Draft Mission Plan Amendment were based on programmatic judgments. They were not intended to set forth any particular legal positions, but rather to describe the Department's considered and informed judgments, based on its actual experience in administering these programs, of the course and timing that the first and second repository programs should take given current circumstances. The Department recognizes that carrying out these programs in the way described in the draft Mission Plan Amendment will require Congressional approval.

The Department hopes Congress will act favorably on the Department's proposal during this current budget cycle. If Congress does not affirm the program as set forth in the Mission Plan Amendment through some legislative action by the end of consideration of the current budget cycle, the Department will go back and try to meet the schedules and requirements of the NWPA.

QUESTIONS FROM SENATOR JOHNSTON

QUESTION 1(b): How will DOE interpret approval by Congress of the $500 million amount for expenditures from the Nuclear Waste Fund contained in the President's budget with regard to your authority to make these amendments effective?

-- What is your answer if the $725 million figure in the budget request is approved?

-- In your view would approval of this level of funding have the effect of repealing any requirements in the Nuclear Waste Policy Act?

ANSWER: The Department is preparing a budget amendment of $225 million for a total request of $725 million which will allow the program described in the Mission Plan Amendment to be carried out. Assuming Congress approves only $500 million of this request, the Department would hope that Congress would provide clarifying guidance for the reduced amounts as to the course and pace of the program.

Assuming there are appropriate directions from Congress accompanying the approval of the full $725 million budget in the budget appropriation report, the Department would consider those directions to be a valid legal instruction and would seek to implement those requirements.

The Department considers that Congressional action on the Department's budget request as documented in a budget appropriation report could provide new direction to the Department in implementing the Nuclear Waste Policy Act.

QUESTIONS FROM SENATOR JOHNSTON

QUESTION 1(c):	How would you answer these questions if Congress approved some amount between $500 million and $725 million?
ANSWER:	The Department would hope that Congress would provide clarifying guidance in any budget appropriation other than the Department's specific request.

QUESTIONS FROM SENATOR JOHNSTON

QUESTION 1(d): If you believe that you are acting within your statutory authority under the Act in making the Mission Plan amendments effective, why are you asking for legislative direction from Congress?

ANSWER: As discussed in our response to Question 1(a), the schedule and plans in the draft Mission Plan Amendment are based on programmatic judgments and are not intended to set forth legal positions. The Department recognizes that carrying out these programs in the way described in the Draft Amendment differs from certain schedules in the NWPA, hence, Congressional approval is necessary.

QUESTIONS FROM SENATOR JOHNSTON

QUESTION 1(e): Haven't the Mission Plan amendments actually been in effect since May 29, 1986?

ANSWER: As a practical matter, the Department has continued to catalog and document the public hearings and associated records developed in connection with the second repository program.

The Department has, however, been concentrating on first repository siting activities as announced in May 1986. If Congress does not affirm the program as described in the proposed Mission Plan Amendment, the Department will go back and try to meet the requirements of the NWPA even though we recognize that some of the dates will be unachievable.

QUESTIONS FROM SENATOR JOHNSTON

Question 2: Incentives

a. Please describe for the Committee your best understanding of what would be the economic impact within the State of repository siting in Texas, in Washington, and in Nevada. Describe the benefit package that DOE plans to offer in each State, your estimate of the number of jobs to be created in each year and any other economics associated with the construction of a repository that is of interest.

b. Has DOE or its contractors ever done a study or provided information and analysis of the potential benefits that might be made available to a State that becomes host for a waste repository or temporary storage facility?

-- If so, when and by whom?

-- What were the major findings?

-- Please provide copies for the record.

c. Has DOE ever discussed with a State or affected Indian Tribe the benefits that would be made available in a State in which a repository is located? Specifically, what was discussed in each instance?

Answer a: The Department of Energy has identified the following general economic impacts associated with a repository:

- Employment
  - Direct construction employment
  - Direct operation employment
  - Indirect construction employment
  - Indirect operation employment

- Economic Activity
  - Wages and salaries from repository spent in local communities
  - Secondary wages and salaries
  - Purchase of project material and supplies

- Public Sector Revenue
  - Payments-Equal-To-Taxes (PETT)
  - Other DOE grants
  - Impact assistance
  - Taxes from contractors
  - Sales taxes from project purchases
  - Sales tax from consumer goods

However, DOE has not proposed any benefits package to Nevada, Texas, and/or Washington.

At this time, DOE's best estimate of the economic impacts of repository siting, construction, and operation in Nevada, Texas, and Washington is as follows:

- Nevada (Yucca Mountain)
  - Nearly 700 direct and indirect jobs during site characterization.
  - Over 4,800 jobs related to the project during peak repository development.

- Nearly 4,500 direct and indirect jobs during peak repository operation.
- Over 1,000 direct and indirect jobs during repository decommissioning.
- The procurement of a substantial portion of exploratory shaft construction and repository construction materials through southern Nevada contractors during site characterization and repository construction.
- Peak annual wages of over $130 million during construction.
- Increased revenues from taxes and from NWPA grants.
- A projected increase in the dollar value of local purchases during site characterization and repository construction.

o Texas (Deaf Smith County, Swisher County)
The worker data for the Deaf Smith site during 1987 and 1988 has been revised from estimates presented in the Final Deaf Smith County Environmental Assessment. DOE now estimates that the number of DOE and contractor employees is expected to exceed the number of employees estimated in the Final Deaf Smith County Environmental Assessment. The increased number of workers reflects estimates of positions from

Requests for Proposals for two integrating and technical contractors. The worker information is subject to change as contractor negotiations proceed. DOE is currently in the process of reviewing the worker data during construction, operation, and decommissioning.

- About 1,200 direct jobs will be created during the first few years of site characterization (revised worker data).

The following data is based on the Final Deaf Smith County Environmental Assessment:

- About 2,000 direct and indirect jobs at the peak of repository development.
  About 2,000 direct and indirect jobs at the peak of repository operation.
  Over 230 direct jobs during repository decommissioning.
- Local fiscal and socioeconomic benefits from the over $250 million spent on project wages and materials during site characterization.
- A projected increase in the dollar volume of local purchases of about $9.4 million per year during repository construction. Additional

increases will accrue during site characterization and exploratory shaft construction.
- Increased revenues from taxes and NWPA grants.

o Washington (Hanford)
- About 2,500 direct and indirect jobs at the peak of site characterization activities, including a substantial number hired locally.
- About 1,100 direct and 1,300 indirect jobs at the peak of repository development, including a substantial number hired locally.
- Over 800 direct and 1,000 indirect jobs at the peak of repository operation.
- A projected increase in the dollar volume of local purchases during site characterization, exploratory shaft construction, and repository construction.
- Increased revenues from taxes and from NWPA grants.

Answer b: Although DOE has examined in the Environmental Assessments the potential economic effects that may occur to a State or local area during site characterization, construction, operation, and decommissioning, neither DOE nor its contractors has conducted a separate formal study to analyze the potential benefits that might be made available to a State that becomes host for a waste repository.

Answer c: DOE has not specifically discussed potential benefits that might accrue to the State or Indian Tribe if a repository were located there. However, the Consultation and Cooperation Agreements may afford DOE and the States and Indian Tribes the opportunity to discuss this issue.

DOE has also examined the potential economic effects to State and local areas of the location of an integral monitored retrievable storage (MRS) facility (which would include some temporary storage). The results of that effort are contained in the MRS proposal, which was submitted to Congress on March 31, 1987.

QUESTIONS FROM SENATOR JOHNSTON

QUESTION 3: Site Ranking Methodology

a. DOE submitted its site-selection methodology to the National Academy of Sciences to assure itself that the methodology was adequate. NAS reviewed the methodology but not DOE's use of the methodology.

and

b. Please describe the task given to NAS, their findings and the implications of these findings for public perception of the program.

ANSWER: The task originally requested of the Board on Radioactive Waste Management/National Academy of Sciences (BRWM/NAS) was "... to perform an independent review of the adequacy of a ranking methodology ..." (ref. letter from B. Busche to F. Parker, August 29, 1985). Subsequent to this, the DOE requested that the BRWM/NAS conduct an "... independent review of the application of the methodology ..." (ref. letter from B. Ruscshe to F. Press, October 30, 1985).

Rather than risk misinterpreting the BRWM's findings by trying to summarize them, we include as attachments their two letter reports on the methodology, the first dated October 10, 1985, and the second dated April 10, 1986.

With regard to the implications of these findings to the perception of the program, we wish to make two points. First, and most obvious, it is gratifying to receive what is essentially a very complimentary review from so prestigious a group as the BRWM/NAS. The favorable review of the BRWM/NAS did much to enhance the credibility of the DOE siting process.

Second, the findings of the BRWM/NAS demonstrate DOE's responsiveness to comments received on draft documents, in this case, draft environmental assessments. As you may be aware, the three simple ranking methodologies presented in the draft EAs were criticized by many reviewers, including the BRWM/NAS. The decision to adopt a formal decision-aiding methodology and to take the time to do the job right were made largely in response to comments on the draft EAs. Also in response to public comments, the DOE requested that the BRWM/NAS conduct an independent review of the methodology.

NATIONAL RESEARCH COUNCIL
COMMISSION ON PHYSICAL SCIENCES, MATHEMATICS, AND RESOURCES
2101 Constitution Avenue Washington, D.C. 20418

BOARD ON
RADIOACTIVE WASTE MANAGEMENT
(202) 334-3066

OFFICE LOCATION
JOSEPH HENRY BUILDING
21ST STREET AND
PENNSYLVANIA AVENUE, N.W.

October 10, 1985

Mr. Ben C. Rusche, Director OCRWM
U.S. Department of Energy
RW-1/Forrestal
Washington, D.C. 20585

Dear Mr. Rusche:

In response to your August 29, 1985 request that the Research Council's Board on Radioactive Waste Management conduct "an independent review of the methodology to be used to evaluate sites for consideration as candidate sites for characterization for the first geologic radioactive waste repository", the Board has reviewed the Department of Energy's (DOE) August 1985 document "A Methodology for Aiding Repository Siting Decisions." The document describes work in progress on the application of the multiattribute utility technique to help the Secretary of Energy select three sites to recommend to the President for characterization as candidate sites for a repository for permanent deep geologic disposal of high level radioactive waste as required by the Nuclear Waste Policy Act (Sec 112 (b) (1) (B)).

The Department of Energy's August methodology paper presents only the basic concepts of the multiattribute utility technique, together with a few simplified illustrative examples. Consequently, it is important to note that, except for some of those involved in multiattribute utility technique itself, the Board on Radioactive Waste Management did not have an opportunity to consider matters of technical substance, such as site-specific data or revisions to the draft Environmental Assessments. Further, since it was not contained in the methodology document, the Board was not able to examine the specific implementation of the multiattribute utility technique being developed by DOE (including performance measure scales, scoring procedures and associated probability distributions, influence diagrams, utility functions, weighting factors, and procedures for selecting panels of technical experts and DOE decision makers).

Nevertheless, the Board commends DOE for its adoption of a rigorous form of this decision-aiding methodology. While recognizing that there is no unique procedure for ranking, the Board believes that the multiattribute utility technique can be an appropriate method by which to integrate technical, economic, environmental, socioeconomic, and health and safety issues to assist DOE in its selection of sites for characterization. Thus we feel that our concern about the appropriateness of the methodology, as expressed in our April 26, 1985 critique of Chapter 7 of the December 1984 Draft Environmental Assessments, has now been addressed.

The National Research Council is the principal operating agency of the National Academy of Sciences and the National Academy of Engineering to serve government and other organizations

Although the multiattribute utility technique proposed by DOE appears appropriate, the technique must be implemented correctly and accurately to be useful and credible. The adequacy of the application of the technique can only be evaluated after the analysis is complete. In the absence of documentation on how the multiattribute utility technique is being applied by DOE we cannot now determine the extent to which our earlier concerns will be answered about the adequacy of site rankings, the appropriateness of documentation supporting and describing the results, and the potential for bias in applying the technique.

The multiattribute utility technique appears to be a promising approach for stating clearly and systematically the assumptions, judgments, preferences, and tradeoffs that must go into a siting decision. As explained in the Board's letter of April 26, 1985, the "utility estimation" technique used in Chapter 7 of the Draft Environmental Assessments was not adequate, because it treated post-closure factors independently and gave them equal weight for all sites. The Board reiterates that a scientifically defensible method of integrating and weighting the post-closure factors at each site is to conduct a "performance assessment" using quantitative models, as recommended in the National Research Council's report on the Waste Isolation Systems Project.

Were adequate data and validated models available, the results of the performance assessments could provide a direct estimate of post-closure performance, which could be integrated with pre-closure factors by using a multiattribute utility technique analysis to compare sites. When currently available performance assessments are not adequate for reliable direct comparison of the expected post-closure performance of the five sites, judgments of experts may be used to develop subjective estimates of the performance of the post-closure factors at each site. DOE has proposed that its technical experts and those of its contractors use this approach to develop performance measure scales and to score each site on those scales. The Board is concerned that DOE's use of its own technical experts to assess performance by this subjective method may mask the degree of real uncertainty associated with post-closure issues.

The Board believes that particular emphasis must be placed on the analysis and comparison of the post-closure performance of the sites in order to test the validity of the conclusion in the Draft Environmental Assessments that the five sites are essentially indistinguishable with respect to the post-closure measures. The credibility of those estimates would be substantially enhanced if an independent panel of outside experts were to review the complete analysis prior to issuance of the final Environmental Assessments.

DOE proposes to use multiattribute utility technique as a decision-aiding rather than decision-making technique. The Board on Radioactive Waste Management supports this limited approach. As stated in our letters of April 2, 1984 to DOE and the U.S. Nuclear Regulatory Commission, "The combination of complexity and uncertainty [in the repository siting problem] implies that DOE must be accorded substantial discretion to exercise its best technical judgment in recommending three of the nominated sites according to Sec. 112 (b) (1) (B)." Proper implementation of the multiattribute utility technique would illuminate DOE's decision process by presenting a comprehensive and explicit specification of the assumptions, value judgments, and technical estimates used in ranking the sites.

The comprehensive, explicit disclosure made possible by the multiattribute utility technique is both a strength and a weakness. Its strength is that it documents a difficult and controversial decision. Its weakness is that the documentation itself will be, of necessity, complex, lengthy, and burdened with concepts that are themselves formidably technical and hard to explain.

The complexity of the multiattribute utility technique demands scrupulous, methodical implementation, and it is crucial that DOE take time to do the job right. More time than is currently planned by DOE to complete the Environmental Assessments may well be needed, but the importance of the decision on site characterization to the implementation of the Nuclear Waste Policy Act as a whole strongly supports the wisdom of a careful, comprehensive application of the technique. A prompt decision now by DOE to take additional time would also permit internal and external review of the key technical components of the multiattribute utility technique.

A potential difficulty is that the siting guidelines specify a hierarchy of importance between the pre- and post-closure groups of factors and among the three groups of pre-closure factors. While the general intent of specifying an order of priority is clear, there remains the possibility that translating a vaguely worded requirement into precise mathematical constraints on the numerical weights estimated as part of the multiattribute utility technique (as proposed by DOE) may lead to implicit value judgments that DOE is not prepared to defend. An early concern of the analysis should be to determine whether or not this is in fact the case.

The Board recommends that the methodology and assessment portion of Chapter 7, because of its importance in site ranking, be written so that it can stand alone with an introduction that puts the candidate site selection process in perspective. The Board also urges that the theory, data, and methods used in the site recommendation process be presented clearly and understandably so that all uncertainties and judgments are made explicit. The Board recognizes that a major advantage of the multiattribute utility technique approach is that it can facilitate such a presentation.

The Board appreciates the difficulty faced by DOE in responding to all the comments on the Draft Environmental Assessments, in revising the assessments, and in applying a more refined technique to help select the three candidate sites. We compliment DOE on the way in which they have responded with a revised methodology to our concerns and those of others about the Draft

Environmental Assessments. The Board supports the rigorous application of the new methodology and would be pleased to amplify any of the points raised in this letter or in our meeting of October 1-3, 1985 with the staff of the Office of Civilian Radioactive Waste Management.

Sincerely,

Frank L. Parker

Frank L. Parker
Chairman
Board on Radioactive
Waste Management

FLP/jc

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COMMISSION ON PHYSICAL SCIENCES, MATHEMATICS, AND RESOURCES
2101 Constitution Avenue Washington, D.C. 20418

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(202) 334-3066

OFFICE LOCATION
JOSEPH HENRY BUILDING
21ST STREET AND
PENNSYLVANIA AVENUE, N.W.

April 10, 1986

Mr. Ben C. Rusche, Director OCRWM
U.S. Department of Energy
RW-1/Forrestal
Washington, D.C. 20585

Dear Mr. Rusche:

In response to your August 29, 1985, request that the National Research Council's Board on Radioactive Waste Management (Board) conduct "an independent review of the methodology to be used to evaluate sites for consideration as candidate sites for characterization for the first geologic repository," and your October 30, 1985, specific request that we further undertake an "independent review of [the] application of the methodology," the Board has reviewed portions of the Department of Energy's (DOE or Department) March 17, 1986, draft of the final Candidate Site Recommendation Report (CSRR). The Board has previously provided DOE with comments on the Department's original draft methodology by its letter of April 26, 1985, and comments on a revised methodological approach by its letter of October 10, 1985.

It is neither appropriate nor the intent of the Board to address the ultimate ranking or the recommendation of specific sites, both of which go beyond the implementation of the decision-aiding methodology. Accordingly, the chapters and appendices reviewed by the Board and its consultants were limited to an overview of the decision-aiding methodology, its application to post-closure factors for all five candidate sites, and its application to pre-closure factors at one site. The Board chose not to review, and at its own request did not have access to, DOE's rankings on pre-closure factors, rankings combining post-closure and pre-closure factors using the decision-aiding methodology, or the final recommendation of sites for characterization. Because of the limits on available time and the volume of the documentation involved, the Board did not attempt to review the site-specific data in the draft Environmental Assessments (EAs). To help conduct this review, the Board enlisted the aid of four consultants, three of whom are recognized experts in multi-attribute utility analysis and its applications.

I. THE DECISION-AIDING METHODOLOGY

The Board commends DOE for the high quality of the chapters that were reviewed. The use of the multi-attribute utility method is appropriate, and the Board is impressed by the care and attention to detail with which it has been implemented. It should be noted, however, that the Board's focus was on

The National Research Council is the principal operating agency of the National Academy of Sciences and the National Academy of Engineering to serve government and other organizations methodology and its implementation and that the Board has not reviewed in detail the data and judgments on which the conclusions from the multi-attribute procedure are based.

While recognizing that there is no single, generally accepted procedure for integrating technical, economic, environmental, socioeconomic, and health and safety issues for ranking sites, the Board believes that the multi-attribute utility method used by DOE is a satisfactory and appropriate decision-aiding tool. The multi-attribute utility method is a useful approach for stating clearly and systematically the assumptions, judgments, preferences, and tradeoffs that must go into a siting decision. The Board strongly supports the DOE position that the methodology is best applied only as a decision-aiding tool and that additional factors and judgments are required to make final decisions about which sites to characterize. These include the diversity of rock types required by the Nuclear Waste Policy Act of 1982, judgments about the ability to license successfully a site including considerations of waste package performance, and judgments about the best set of sites to choose to assure the highest likelihood of a licensable site emerging from the characterization process.

The Board is disappointed that DOE did not follow the recommendation, made in the Board's April 26 and October 10 letters, that independent experts be brought into the assessment process itself as well as into the review of the process. As noted in the October letter, "The Board is concerned that DOE's use of its own technical experts to assess performance by this subjective method may mask the degree of real uncertainty associated with post-closure issues." The Board has seen nothing to indicate bias in the implementation of the method and recognizes that, in this instance, the DOE sensitivity analysis applied to post-closure issues indicates that the rankings on these issues would not change with reasonable or plausible changes in the parameters and judgments. In other applications of the methodology, however, the results may not be so insensitive to the judgments. In that event the addition of independent experts in the generation of those judgments would be important. A final concern with the review draft remains: the need for additional documentation beyond that included in the March 17, 1986, draft of the reasoning and judgement involved in the choices of the scores and probabilities associated with the various scenarios. On the basis of discussions with DOE staff, the Board anticipates a satisfactory response to this concern in the final version of the CSRR.

II. POST-CLOSURE ANALYSES

The DOE application of the multi-attribute utility method for the post-closure factors provides useful information concerning the Department's current judgment of the expected performance of the sites for the post-closure period and on its judgment of the range of uncertainties. The Board reiterates that, when adequate data and validated models are available, conducting a probabilistic "performance assessment" using quantitative models, as recommended by the National Research Council[1], is a scientifically defensible method of integrating and weighting the post-closure factors at each site. In the absence of performance assessments capable of comparing the expected post-closure performance of the sites directly, judgments of experts are appropriately used to develop subjective estimates of the post-closure factors at each site. DOE has implemented this approach using its technical experts and those of its contractors, and it appears to have incorporated information resulting from models on the release and migration of radionuclides to the "accessible environment" (as defined by the Environmental Protection Agency (EPA)). The Department has also conducted an extensive sensitivity analysis.

The DOE analysis assesses post-closure performance based on probabilities of releases to an arbitrarily defined and universally applied accessible environment. This approach is consistent with the DOE siting guidelines and follows the requirements for repository performance established in the EPA Standard (40 CFR 191). Because this approach does not take into account the differences among sites in pathways from the EPA accessible environment to the biosphere, and thus the potential consequences of any given release at the accessible environment, the Board recommends that the DOE decision makers consider such differences in addition to the results of the decision-aiding methodology. Chapter 6, which the Board has been told considers decision factors beyond the scope of the multi-attribute utility method, would seem to be the appropriate place to incorporate such consideration for the present decision. If the multi-attribute utility method is applied to a future site selection process, however, the evaluation of relative environmental consequences should become part of the post-closure analysis. Such an approach would facilitate comparison of post- and pre-closure results.

III. PRE-CLOSURE ANALYSES

The pre-closure results are stated in terms of dollar costs, estimated lives lost in building and operating a repository, and performance measures covering esthetic, archeological, biological and socioeconomic impacts. Although the multi-attribute utility method significantly clarifies the relative importance of the many factors considered in ranking sites, the reduction of all attributes to a single quantitative scale depends, in this application, upon the value tradeoffs made by DOE staff. In addition to the sensitivity analysis they conducted, the Department decision makers might have found it beneficial in the selection of objectives and in weighing pre-closure factors to draw on value judgments from a variety of sources outside the DOE.

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[1] National Research Council 1983. A Study of the Isolation System for Geologic Disposal of Radioactive Wastes. Board on Radioactive Waste Management, Panel on Waste Isolation Systems. National Academy Press, Washington, D.C.

On the basis of the Board's review of the application to a single site, it appears that the expected total repository and transportation costs will have a major, if not controlling, effect on the rankings under pre-closure factors. This recognition of the heavy dependence on cost reinforces the Board's judgment that the principal usefulness of the multi-attribute utility method is to illuminate the factors involved in a decision, rather than to make the decision itself.

IV. CONCLUSIONS

In addition to the multi-attribute decision analysis, there are other factors that must be taken into account in the final decision to select three sites for characterization. These include the diversity of rock types required by the Nuclear Waste Policy Act of 1982, judgments about the ability to license successfully a site including considerations of waste package performance, and judgments about the best set of sites to choose to assure the highest likelihood of a licensable site emerging from the characterization process.

When the Board commented on the Draft Environmental Assessments a year ago, it expressed strong reservations about the methods used by DOE to select sites for characterization. The Department has made substantial progress since then. As stated in the Board's October 10, 1985, report, "...our concern about the appropriateness of the methodology, as expressed in our April 26, 1985, critique of Chapter 7 of the December, 1984, Draft Environmental Assessments, has now ~~been addressed." DOE has now selected a decision~~-aiding method that the Board believes is appropriate to the complexity and technical uncertainties of the decision the Department faces in choosing sites to characterize.

Although the Board has not seen the final version of the CSRR, those parts of the draft it has reviewed include substantial documentation of the site-ranking method and the way it has been implemented. On the basis of discussions with DOE staff, we anticipate satisfactory responses to our remaining concerns about documentation in the final CSRR.

In its review of the implementation of the site-ranking methodology, then, the Board finds much to praise. It is important to note that the Board reviewed neither the data in the draft EAs nor the application of the procedures in which sites were scored and value tradeoffs were assessed. Moreover, DOE did not take the Board's advice, offered twice in writing, to involve outside groups of experts in the site-ranking process beyond this review of the implementation of the methodology by the Board. The Board has seen nothing to indicate bias in the Department's implementation of the methodology and recognizes the value of the DOE sensitivity analysis, but the lack of external input in technical and value judgments could raise concerns about bias.

Despite the limitations in the scope of the Board's review, we believe the methods used in the CSRR provide a sound analytical basis for aiding the site characterization decision. The Board commends the Department of Energy for taking the time and devoting the resources to identify and apply a comprehensive decision-aiding methodology. We believe that the methodology the Department has selected represents "state of the art" and is adequate and appropriate for this purpose. We compliment DOE on its care and diligence in implementing the site-ranking methodology, and encourage the Department to build on the experience it has gained as it continues the search for a geologic repository.

Sincerely,

Frank L Parker

Frank L. Parker
Chairman, Board on
Radioactive Waste Management

FLP:jc

QUESTIONS FROM SENATOR JOHNSTON

QUESTION 3c: The States and Indian Tribes have charged that DOE manipulated data to come up with its selection of the Hanford, Yucca Mountain, and Deaf Smith sites characterization. How do you respond to these charges?

ANSWER: The States and Indian Tribes charges are comparable to those made in the House subcommittee staff memorandum entitled "Preliminary Results of Staff Investigation Into DOE's Selection of Three Sites for Characterization as the Nation's First Repository for High-Level Radioactive Waste." The DOE has prepared a detailed response to this memorandum documented as a letter to Congressmen Markey, Swift, and Wyden dated February 18, 1987. The response letter is included as an attachment.

Very briefly, we believe the evidence presented in the response letter demonstrates that the charges of manipulating data to come up with a predetermined set of sites are without foundation.

Department of Energy
Washington, DC 20585

FEB 18 1987

Honorable Edward J. Markey
House of Representatives
Washington, D.C. 20515

Dear Mr. Markey:

We have carefully reviewed your letter of October 20, 1986, and the accompanying staff memorandum entitled "Preliminary Results of Staff Investigation into DOE's Selection of Three Sites for Characterization as the Nation's First Repository for High-Level Radioactive Waste." While we appreciate your interest in understanding and analyzing the decision process, we are dismayed by the comments made in these documents. After careful analysis, we conclude that, almost without exception, the findings of your staff's investigation are without basis.

The enclosed paper presents a point-by-point response to the principal points made in your letter and your staff's memorandum. I would like to summarize the principal conclusions here and attempt to clarify the role of the multiattribute utility analysis (MUA) in our decision since there is a consistent misinterpretation of its role in the staff memorandum.

Perhaps most important, we believe that you have not presented any credible evidence to substantiate criticisms that the Department of Energy (DOE) distorted and manipulated the MUA to produce a desired result--because none exists. No technical results whatever of that analysis were changed to promote or downgrade any site. Furthermore, state-of-the-art techniques were used to minimize the potential for conscious or unconscious biases to affect the results, and the Board on Radioactive Waste Management of the National Academy of Sciences (BRWM/NAS) stated that they found no evidence of bias in DOE's implementation of the methodology.

With respect to the comment that DOE edited the methodology and recommendation reports to suppress information unfavorable to the Hanford site or to the Deaf Smith site, we believe that the best measure of DOE's actions is not what passages were deleted from drafts during editing, but rather what passages remained in the final published reports. Our review of the language you indicate was removed from early drafts shows that in most cases language very similar in substance -- in some cases verbatim language -- was retained in the final reports. The remaining deletions were made for legitimate editorial reasons, most often to eliminate redundancies. Some deletions were also made to remove inappropriate judgments, for example, about which sites to characterize

or about the significance of differences among the sites, that overstepped the bounds of the decision-aiding role of the MUA. An excellent example of such an inappropriate judgment is found in the quote that appears at the top of page three of your letter of October 20.

Finally, we disagree that rock-type diversity was the sole basis for our selection of Hanford, and that we should have included that factor explicitly in the methodology. Diversity was clearly an important consideration. Indeed, the Nuclear Waste Policy Act of 1982 (the Act) itself requires DOE to recommend sites for characterization in different rock types "to the extent practicable," and diversity provides a number of important benefits, including insurance against the possibility of common-mode problems that could affect all sites in a given rock type. But diversity was not the only consideration. As the MUA indicates, Hanford is expected to have excellent postclosure performance, and the lowest adverse impacts on the community and environment in the vicinity of the site.

Because rock-type diversity is a property of portfolios of sites, while the MUA compared sites in terms of their individual characteristics, diversity could not have simply been "included in the methodology, so it could have been considered and weighted along with the other factors," as you suggest. A rigorous, formal evaluation of the effects of diversity would have required an additional, more complex form of analysis involving highly speculative judgments about such things as future licensing actions. Instead, we considered the portfolio effects qualitatively, as is commonly done in other portfolio-type problems. Such an approach is entirely consistent with the Act and the DOE siting guidelines.

In addition to responding to these specific comments, I would like to clarify a misunderstanding that permeates both your letter and your staff's analysis and that leads to many erroneous conclusions and inferences. This misunderstanding relates to the capability and role of the MUA in the decision process. That you view the MUA to be something that it is not is revealed by references in your letter to the MUA as a "more rigorous selection methodology," and in the statement that "DOE distorted and disregarded its own scientific analysis in order to support selection of the Hanford, Washington, site and to avoid selection of the Richton Dome, Mississippi, site." These statements indicate a belief that the MUA is capable of providing a "scientific" ranking of the five nominated sites -- a ranking somehow devoid of judgment -- which should then be used as the sole basis for selecting three for characterization. Without this fundamental premise, there are no logical grounds for criticizing DOE for not selecting the three top-ranked sites identified by the MUA, or for inferring that DOE "ignored" the

results of the MUA. Indeed, without that premise, there is no incentive for DOE to engage in all of the "manipulations" and "distortions" you believe were undertaken to promote Hanford into the top three sites.

This basic premise is false. The methodology was never intended or designed to make the decision about which sites to characterize, only to aid the responsible decision-maker, the Secretary of Energy, by providing insights about the advantages and disadvantages of the sites. There was no presumption that the three sites ranked highest by the MUA should be the three selected for characterization, and thus no need or incentive to manipulate the MUA to promote any supposedly favored site into the top three.

Limiting the role of the MUA in the decision process is appropriate for four important reasons. First, as attractive as it might be to shift the burden of decision to a "scientific decision methodology" (a phrase used in your staff memo to describe the MUA), no such methodology exists. As the BRWM/NAS stated in its review of the MUA, "there is no single, generally accepted procedure for integrating technical, economic, environmental, socioeconomic, and health and safety issues for ranking sites." The guidelines do not specify any particular method for ranking sites. Indeed, the idea of an "objective" numerical method for "computing" siting decisions was discussed and rejected in the final decision about the guidelines. We could find no support in the technical community for such a method and were unable to determine a framework that would be sufficiently complete to eliminate the exercise of judgment on the part of Federal officials who make the siting decisions. In its April 2, 1984, letters to DOE and the NRC concerning the draft siting guidelines, the BRWM/NAS said: "The combination of complexity and uncertainty [in the repository siting problem] implies that DOE must be accorded substantial discretion to exercise its best technical judgments in recommending three of the nominated sites. . . ."

Second, the MUA, like any such methodology, involves the simplification of a complex reality. It is capable of providing only a partial and approximate accounting of the many factors important to the site-recommendation decision. Basing siting decisions solely on the numerical results of an unavoidably limited formal analysis would be improper. These are decisions about real sites that affect unique communities and people, not about mathematical abstractions. No amount of analysis would relieve DOE of the ultimate responsibility to make its decision based on consideration of the full range of data and information in the Environmental Assessments (EAs).

Third, the significance of the aggregate ranking produced by the methodology must be tempered by an appreciation of the relatively limited data available before characterization. For example, the cost estimates used in the MUA are based on current system designs that may change significantly as a result of the information gained during site characterization and of later decisions about the overall waste-management system (e.g., construction of an MRS). A geologic repository is a first-of-its-kind engineering task, and it is wise to be modest about our ability to predict the ultimate design that will emerge at the end of the licensing process (also a first-of-its-kind enterprise). The range of uncertainty on costs incorporated in the MUA does not include uncertainty about system design, only the types of uncertainties inherent in any large construction project with a given design. Uncertainties not accounted for in the MUA, such as the possibility of as-yet-unidentified factors, may ultimately overshadow current estimates of site differences.

Finally, any methodology for ranking sites based on their individual attributes would be unable to fully take account of the important factor of rock-type diversity, which is an attribute of sets of sites rather than of individual sites. As discussed earlier and in the enclosure to this letter, there is no _a priori_ reason for concluding that the three sites that rank at the top when the sites are considered individually would make up the best set of three for characterization when diversity is taken into account. Thus there are no logical grounds for concluding that failure to select the top-ranked three sites is _prima facie_ evidence of flawed decisionmaking.

In summary, because of the limitations of this or of any formal methodology that might be used to model the key factors in a decision problem, it is necessary to supplement the insights gained from the methodology with professional experience and judgment. That the methodology must be decision-aiding and not decision-making has been stressed by DOE from the beginning and was unequivocally endorsed by the BRWM/NAS in its review letters to DOE. Since the MUA was never intended or designed to make the decision, all of the criticisms based on the incorrect premise that it was, are unfounded.

Despite its limitations, the application of a formal methodology as part of the decision process provided a number of important advantages. Unlike the simpler methods used to rank the sites in the draft EAs, the MUA produced quantitative estimates of the performance of each site on each siting factor specified in the guidelines. Combining these estimates with the explicit value judgments required by the analysis gave valuable insights into the importance of the differences among the sites. For example, it showed that all of the sites are expected to release radioactive materials at levels that are very far below the levels allowed by EPA standards, and that the differences between the sites are not significant.

Furthermore, the MUA makes the process of analysis explicit and open to review. It clearly separates the technical judgments about the performance and impacts of a repository at the various sites from value judgments about the desirability of those possible impacts, and makes both types of judgments explicit. This makes it easy for readers to determine which judgments are important to the conclusions of the analysis and which are not, and allows them to test the implications of different value judgments and technical judgments. DOE does not expect that everyone will agree with all of the assumptions and judgments included in the analysis. However, DOE believes that it is very valuable to have those assumptions and judgments stated clearly and precisely, so that others can evaluate them and see whether their own judgments would lead to significantly different conclusions.

In conclusion, the responses we have provided here and in the enclosed paper demonstrate that all comments related to developing the MUA after having fixed immutably on a predetermined set of sites, as well as comments related to manipulation of results, are without foundation. We do not believe that the open and well-documented process by which DOE has approached the selection of sites for characterization should damage the credibility of the repository program. Quite the contrary, the fact that the Subcommittee staff was able to critically analyze the decision demonstrates the unprecedented openness of the decision process. For these reasons, we must reject your statement that the site-recommendation decision is "seriously flawed and totally unsupportable."

Further, we believe any additional analysis beyond what was done to support the May 28 decisions would not be cost-effective. We have seen nothing to indicate that application of a formal portfolio analysis would reveal important new insights that would warrant reconsideration of our decision. We believe that the best way to enhance credibility at this time is to get on with the important job of gathering detailed data about the three sites, as mandated by the Act, rather than to continue to analyze the limited data that are available before characterization.

I would welcome the opportunity to discuss these points with you further at your convenience.

Sincerely,

Ben C. Rusche

Ben C. Rusche, Director
Office of Civilian Radioactive
Waste Management

Enclosure

Department of Energy
Washington, DC 20585

FEB 18 1987

Honorable Ron Wyden
House of Representatives
Washington, D.C. 20515

Dear Mr. Wyden:

We have carefully reviewed your letter of October 20, 1986, and the accompanying staff memorandum entitled "Preliminary Results of Staff Investigation into DOE's Selection of Three Sites for Characterization as the Nation's First Repository for High-Level Radioactive Waste." While we appreciate your interest in understanding and analyzing the decision process, we are dismayed by the comments made in these documents. After careful analysis, we conclude that, almost without exception, the findings of your staff's investigation are without basis.

The enclosed paper presents a point-by-point response to the principal points made in your letter and your staff's memorandum. I would like to summarize the principal conclusions here and attempt to clarify the role of the multiattribute utility analysis (MUA) in our decision since there is a consistent misinterpretation of its role in the staff memorandum.

Perhaps most important, we believe that you have not presented any credible evidence to substantiate criticisms that the Department of Energy (DOE) distorted and manipulated the MUA to produce a desired result--because none exists. No technical results whatever of that analysis were changed to promote or downgrade any site. Furthermore, state-of-the-art techniques were used to minimize the potential for conscious or unconscious biases to affect the results, and the Board on Radioactive Waste Management of the National Academy of Sciences (BRWM/NAS) stated that they found no evidence of bias in DOE's implementation of the methodology.

With respect to the comment that DOE edited the methodology and recommendation reports to suppress information unfavorable to the Hanford site or to the Deaf Smith site, we believe that the best measure of DOE's actions is not what passages were deleted from drafts during editing, but rather what passages remained in the final published reports. Our review of the language you indicate was removed from early drafts shows that in most cases language very similar in substance -- in some cases verbatim language -- was retained in the final reports. The remaining deletions were made for legitimate editorial reasons, most often to eliminate redundancies. Some deletions were also made to remove inappropriate judgments, for example, about which sites to characterize

or about the significance of differences among the sites, that overstepped the bounds of the decision-aiding role of the MUA. An excellent example of such an inappropriate judgment is found in the quote that appears at the top of page three of your letter of October 20.

Finally, we disagree that rock-type diversity was the sole basis for our selection of Hanford, and that we should have included that factor explicitly in the methodology. Diversity was clearly an important consideration. Indeed, the Nuclear Waste Policy Act of 1982 (the Act) itself requires DOE to recommend sites for characterization in different rock types "to the extent practicable," and diversity provides a number of important benefits, including insurance against the possibility of common-mode problems that could affect all sites in a given rock type. But diversity was not the only consideration. As the MUA indicates, Hanford is expected to have excellent postclosure performance, and the lowest adverse impacts on the community and environment in the vicinity of the site.

Because rock-type diversity is a property of portfolios of sites, while the MUA compared sites in terms of their individual characteristics, diversity could not have simply been "included in the methodology, so it could have been considered and weighted along with the other factors," as you suggest. A rigorous, formal evaluation of the effects of diversity would have required an additional, more complex form of analysis involving highly speculative judgments about such things as future licensing actions. Instead, we considered the portfolio effects qualitatively, as is commonly done in other portfolio-type problems. Such an approach is entirely consistent with the Act and the DOE siting guidelines.

In addition to responding to these specific comments, I would like to clarify a misunderstanding that permeates both your letter and your staff's analysis and that leads to many erroneous conclusions and inferences. This misunderstanding relates to the capability and role of the MUA in the decision process. That you view the MUA to be something that it is not is revealed by references in your letter to the MUA as a "more rigorous selection methodology," and in the statement that "DOE distorted and disregarded its own scientific analysis in order to support selection of the Hanford, Washington, site and to avoid selection of the Richton Dome, Mississippi, site." These statements indicate a belief that the MUA is capable of providing a "scientific" ranking of the five nominated sites -- a ranking somehow devoid of judgment -- which should then be used as the sole basis for selecting three for characterization. Without this fundamental premise, there are no logical grounds for criticizing DOE for not selecting the three top-ranked sites identified by the MUA, or for inferring that DOE "ignored" the

results of the MUA. Indeed, without that premise, there is no incentive for DOE to engage in all of the "manipulations" and "distortions" you believe were undertaken to promote Hanford into the top three sites.

This basic premise is false. The methodology was never intended or designed to make the decision about which sites to characterize, only to aid the responsible decision-maker, the Secretary of Energy, by providing insights about the advantages and disadvantages of the sites. There was no presumption that the three sites ranked highest by the MUA should be the three selected for characterization, and thus no need or incentive to manipulate the MUA to promote any supposedly favored site into the top three.

Limiting the role of the MUA in the decision process is appropriate for four important reasons. First, as attractive as it might be to shift the burden of decision to a "scientific decision methodology" (a phrase used in your staff memo to describe the MUA), no such methodology exists. As the BRWM/NAS stated in its review of the MUA, "there is no single, generally accepted procedure for integrating technical, economic, environmental, socioeconomic, and health and safety issues for ranking sites." The guidelines do not specify any particular method for ranking sites. Indeed, the idea of an "objective" numerical method for "computing" siting decisions was discussed and rejected in the final decision about the guidelines. We could find no support in the technical community for such a method and were unable to determine a framework that would be sufficiently complete to eliminate the exercise of judgment on the part of Federal officials who make the siting decisions. In its April 2, 1984, letters to DOE and the NRC concerning the draft siting guidelines, the BRWM/NAS said: "The combination of complexity and uncertainty [in the repository siting problem] implies that DOE must be accorded substantial discretion to exercise its best technical judgments in recommending three of the nominated sites. . . ."

Second, the MUA, like any such methodology, involves the simplification of a complex reality. It is capable of providing only a partial and approximate accounting of the many factors important to the site-recommendation decision. Basing siting decisions solely on the numerical results of an unavoidably limited formal analysis would be improper. These are decisions about real sites that affect unique communities and people, not about mathematical abstractions. No amount of analysis would relieve DOE of the ultimate responsibility to make its decision based on consideration of the full range of data and information in the Environmental Assessments (EAs).

Third, the significance of the aggregate ranking produced by the methodology must be tempered by an appreciation of the relatively limited data available before characterization. For example, the cost estimates used in the MUA are based on current system designs that may change significantly as a result of the information gained during site characterization and of later decisions about the overall waste-management system (e.g., construction of an MRS). A geologic repository is a first-of-its-kind engineering task, and it is wise to be modest about our ability to predict the ultimate design that will emerge at the end of the licensing process (also a first-of-its-kind enterprise). The range of uncertainty on costs incorporated in the MUA does not include uncertainty about system design, only the types of uncertainties inherent in any large construction project with a given design. Uncertainties not accounted for in the MUA, such as the possibility of as-yet-unidentified factors, may ultimately overshadow current estimates of site differences.

Finally, any methodology for ranking sites based on their individual attributes would be unable to fully take account of the important factor of rock-type diversity, which is an attribute of sets of sites rather than of individual sites. As discussed earlier and in the enclosure to this letter, there is no *a priori* reason for concluding that the three sites that rank at the top when the sites are considered individually would make up the best set of three for characterization when diversity is taken into account. Thus there are no logical grounds for concluding that failure to select the top-ranked three sites is *prima facie* evidence of flawed decisionmaking.

In summary, because of the limitations of this or of any formal methodology that might be used to model the key factors in a decision problem, it is necessary to supplement the insights gained from the methodology with professional experience and judgment. That the methodology must be decision-aiding and not decision-making has been stressed by DOE from the beginning and was unequivocally endorsed by the BRWM/NAS in its review letters to DOE. Since the MUA was never intended or designed to make the decision, all of the criticisms based on the incorrect premise that it was, are unfounded.

Despite its limitations, the application of a formal methodology as part of the decision process provided a number of important advantages. Unlike the simpler methods used to rank the sites in the draft EAs, the MUA produced quantitative estimates of the performance of each site on each siting factor specified in the guidelines. Combining these estimates with the explicit value judgments required by the analysis gave valuable insights into the importance of the differences among the sites. For example, it showed that all of the sites are expected to release radioactive materials at levels that are very far below the levels allowed by EPA standards, and that the differences between the sites are not significant.

Furthermore, the MUA makes the process of analysis explicit and open to review. It clearly separates the technical judgments about the performance and impacts of a repository at the various sites from value judgments about the desirability of those possible impacts, and makes both types of judgments explicit. This makes it easy for readers to determine which judgments are important to the conclusions of the analysis and which are not, and allows them to test the implications of different value judgments and technical judgments. DOE does not expect that everyone will agree with all of the assumptions and judgments included in the analysis. However, DOE believes that it is very valuable to have those assumptions and judgments stated clearly and precisely, so that others can evaluate them and see whether their own judgments would lead to significantly different conclusions.

In conclusion, the responses we have provided here and in the enclosed paper demonstrate that all comments related to developing the MUA after having fixed immutably on a predetermined set of sites, as well as comments related to manipulation of results, are without foundation. We do not believe that the open and well-documented process by which DOE has approached the selection of sites for characterization should damage the credibility of the repository program. Quite the contrary, the fact that the Subcommittee staff was able to critically analyze the decision demonstrates the unprecedented openness of the decision process. For these reasons, we must reject your statement that the site-recommendation decision is "seriously flawed and totally unsupportable."

Further, we believe any additional analysis beyond what was done to support the May 28 decisions would not be cost-effective. We have seen nothing to indicate that application of a formal portfolio analysis would reveal important new insights that would warrant reconsideration of our decision. We believe that the best way to enhance credibility at this time is to get on with the important job of gathering detailed data about the three sites, as mandated by the Act, rather than to continue to analyze the limited data that are available before characterization.

I would welcome the opportunity to discuss these points with you further at your convenience.

Sincerely,

Ben C Rusche

Ben C. Rusche, Director
Office of Civilian Radioactive
Waste Management

Enclosure

Department of Energy
Washington, DC 20585

FEB 18 1987

Honorable Al Swift
House of Representatives
Washington, D.C. 20515

Dear Mr. Swift:

We have carefully reviewed your letter of October 20, 1986, and the accompanying staff memorandum entitled "Preliminary Results of Staff Investigation into DOE's Selection of Three Sites for Characterization as the Nation's First Repository for High-Level Radioactive Waste." While we appreciate your interest in understanding and analyzing the decision process, we are dismayed by the comments made in these documents. After careful analysis, we conclude that, almost without exception, the findings of your staff's investigation are without basis.

The enclosed paper presents a point-by-point response to the principal points made in your letter and your staff's memorandum. I would like to summarize the principal conclusions here and attempt to clarify the role of the multiattribute utility analysis (MUA) in our decision since there is a consistent misinterpretation of its role in the staff memorandum.

Perhaps most important, we believe that you have not presented any credible evidence to substantiate criticisms that the Department of Energy (DOE) distorted and manipulated the MUA to produce a desired result--because none exists. No technical results whatever of that analysis were changed to promote or downgrade any site. Furthermore, state-of-the-art techniques were used to minimize the potential for conscious or unconscious biases to affect the results, and the Board on Radioactive Waste Management of the National Academy of Sciences (BRWM/NAS) stated that they found no evidence of bias in DOE's implementation of the methodology.

With respect to the comment that DOE edited the methodology and recommendation reports to suppress information unfavorable to the Hanford site or to the Deaf Smith site, we believe that the best measure of DOE's actions is not what passages were deleted from drafts during editing, but rather what passages remained in the final published reports. Our review of the language you indicate was removed from early drafts shows that in most cases language very similar in substance -- in some cases verbatim language -- was retained in the final reports. The remaining deletions were made for legitimate editorial reasons, most often to eliminate redundancies. Some deletions were also made to remove inappropriate judgments, for example, about which sites to characterize

or about the significance of differences among the sites, that overstepped the bounds of the decision-aiding role of the MUA. An excellent example of such an inappropriate judgment is found in the quote that appears at the top of page three of your letter of October 20.

Finally, we disagree that rock-type diversity was the sole basis for our selection of Hanford, and that we should have included that factor explicitly in the methodology. Diversity was clearly an important consideration. Indeed, the Nuclear Waste Policy Act of 1982 (the Act) itself requires DOE to recommend sites for characterization in different rock types "to the extent practicable," and diversity provides a number of important benefits, including insurance against the possibility of common-mode problems that could affect all sites in a given rock type. But diversity was not the only consideration. As the MUA indicates, Hanford is expected to have excellent postclosure performance, and the lowest adverse impacts on the community and environment in the vicinity of the site.

Because rock-type diversity is a property of portfolios of sites, while the MUA compared sites in terms of their individual characteristics, diversity could not have simply been "included in the methodology, so it could have been considered and weighted along with the other factors," as you suggest. A rigorous, formal evaluation of the effects of diversity would have required an additional, more complex form of analysis involving highly speculative judgments about such things as future licensing actions. Instead, we considered the portfolio effects qualitatively, as is commonly done in other portfolio-type problems. Such an approach is entirely consistent with the Act and the DOE siting guidelines.

In addition to responding to these specific comments, I would like to clarify a misunderstanding that permeates both your letter and your staff's analysis and that leads to many erroneous conclusions and inferences. This misunderstanding relates to the capability and role of the MUA in the decision process. That you view the MUA to be something that it is not is revealed by references in your letter to the MUA as a "more rigorous selection methodology," and in the statement that "DOE distorted and disregarded its own scientific analysis in order to support selection of the Hanford, Washington, site and to avoid selection of the Richton Dome, Mississippi, site." These statements indicate a belief that the MUA is capable of providing a "scientific" ranking of the five nominated sites -- a ranking somehow devoid of judgment -- which should then be used as the sole basis for selecting three for characterization. Without this fundamental premise, there are no logical grounds for criticizing DOE for not selecting the three top-ranked sites identified by the MUA, or for inferring that DOE "ignored" the

results of the MUA. Indeed, without that premise, there is no incentive for DOE to engage in all of the "manipulations" and "distortions" you believe were undertaken to promote Hanford into the top three sites.

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In summary, because of the limitations of this or of any formal methodology that might be used to model the key factors in a decision problem, it is necessary to supplement the insights gained from the methodology with professional experience and judgment. That the methodology must be decision-aiding and not decision-making has been stressed by DOE from the beginning and was unequivocally endorsed by the BRWM/NAS in its review letters to DOE. Since the MUA was never intended or designed to make the decision, all of the criticisms based on the incorrect premise that it was, are unfounded.

Despite its limitations, the application of a formal methodology as part of the decision process provided a number of important advantages. Unlike the simpler methods used to rank the sites in the draft EAs, the MUA produced quantitative estimates of the performance of each site on each siting factor specified in the guidelines. Combining these estimates with the explicit value judgments required by the analysis gave valuable insights into the importance of the differences among the sites. For example, it showed that all of the sites are expected to release radioactive materials at levels that are very far below the levels allowed by EPA standards, and that the differences between the sites are not significant.

Furthermore, the MUA makes the process of analysis explicit and open to review. It clearly separates the technical judgments about the performance and impacts of a repository at the various sites from value judgments about the desirability of those possible impacts, and makes both types of judgments explicit. This makes it easy for readers to determine which judgments are important to the conclusions of the analysis and which are not, and allows them to test the implications of different value judgments and technical judgments. DOE does not expect that everyone will agree with all of the assumptions and judgments included in the analysis. However, DOE believes that it is very valuable to have those assumptions and judgments stated clearly and precisely, so that others can evaluate them and see whether their own judgments would lead to significantly different conclusions.

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Further, we believe any additional analysis beyond what was done to support the May 28 decisions would not be cost-effective. We have seen nothing to indicate that application of a formal portfolio analysis would reveal important new insights that would warrant reconsideration of our decision. We believe that the best way to enhance credibility at this time is to get on with the important job of gathering detailed data about the three sites, as mandated by the Act, rather than to continue to analyze the limited data that are available before characterization.

I would welcome the opportunity to discuss these points with you further at your convenience.

Sincerely,

Ben C Rusche

Ben C. Rusche, Director
Office of Civilian Radioactive
Waste Management

Enclosure

ENCLOSURE

Comment 1: DOE deliberately misled the Congress as to the existence of documents.

DOE did not deliberately mislead the Subcommittee on Energy Conservation and Power as to the existence of draft working documents of either the methodology report or the recommendation report. DOE did not retain working drafts in its general office files. Such a procedure is routine and consistent with DOE directives not to retain such materials. In some cases, working drafts of these documents were retained in the personal files of individuals intimately involved with writing or reviewing these documents. All retained documents, whether in official or personal files, were made readily available for the perusal of the Subcommittee staff and, for its convenience, were categorized and filed at one central location at DOE.

Comment 2: DOE systematically and deliberately distorted, suppressed, and manipulated its own scientific data and analysis in an effort to promote the Hanford site and to downgrade the Richton Dome site.

The statement that DOE systematically distorted and manipulated data, that is, technical and value judgments, in working drafts of the methodology report is false. No technical results whatsoever were changed to promote the Hanford site or downgrade the Richton Dome site or any site for that matter. To check this statement, the Subcommittee is invited to compare data contained in the March 17, 1986, submittal to the Board on Radioactive Waste Management of the National Academy of Sciences (BRWM/NAS) with data in the final methodology report. The estimates of preclosure impacts for the Richton Dome site, for example, are exactly the same in the two documents (cf. Table 4-9 in the March 17 submittal with Table 4-8 in the final methodology report).

The Subcommittee further contends that the fact that the preparation of the methodology and recommendation reports overlapped to some degree is evidence of wrongdoing. We disagree. The methodology report was in large measure complete -- certainly the major insights had been communicated to the Director, OCRWM -- by the time the first meeting discussing the need for the recommendation report was held on April 4, 1986. In any case, since the methodology was never intended or designed to make the decision, we do not regard the parallel preparation of the two documents as irregular.

Irrespective of the timing issue, the central question is whether, by deletions, DOE suppressed information about the estimated deficiencies of the Hanford site. We submit that a truer, more accurate measure of whether information was suppressed is not what passages were deleted during the routine editing process but rather what passages remained after that process. The following passages from the final methodology report demonstrate clearly that comments related to suppressing unfavorable information about any of the sites are unfounded.

> Pg. 3-43, first paragraph: "From the relative ranking of the sites and estimates of uncertainty, it appears that the postclosure performance of a repository at the Hanford site would be slightly less favorable than that of a repository at the salt sites or at the Yucca Mountain site."

> Pg. 4-36, fifth paragraph: ". . . The overall preclosure ranking is Yucca Mountain, Richton Dome, Deaf Smith, Davis Canyon, and Hanford. In terms of equivalent-consequence impacts, the difference between Yucca Mountain and Richton is the equivalent of 1119 million dollars, between Richton Dome and Deaf Smith 640 million dollars, between Deaf Smith and Davis Canyon 1127 million dollars, and between Davis Canyon and Hanford 2552 million dollars."

> Pg. 4-37, first paragraph: ". . . the relative [preclosure] ranking of sites obtained for the base case is totally insensitive to any changes in the level of impacts except for costs. Furthermore, the ranking is insensitive to any reasonable changes in the value judgments or in the form of the utility function."

> Pg. 5-4, third paragraph: ". . . certain patterns are clear and stable under a wide range of assumptions. The Hanford site is in all cases ranked fifth. . . ."

> Pg. 5-16, first paragraph: "This ranking [referring to the overall ranking of Yucca Mountain, Richton Dome, Deaf Smith, Davis Canyon, and Hanford] is stable except for the most extreme weightings of postclosure versus preclosure performance."

Other sentences stating estimated deficiences of the Hanford site appear in Chapters 3, 4, and 5 of the final methodology report.

On review of statements like those quoted above, Dr. Frank L. Parker, Chairman of the BRWM/NAS, in a letter to Congressman Weaver dated November 6, 1986, stated:

> "In view of these summary statements, I cannot possibly agree with Findings 5, 6, and 7 that state that the MUA was 'distorted,' 'flawed,' and 'contrived,' to place Hanford high in the list of sites to be characterized."

While it is true that during the course of developing the methodology report passages were both added and deleted from working drafts, these changes were appropriate because they were all directed at improving the quality of the report. As in any writing job, critical reviews of drafts by people other than the primary authors (i.e., others on the MUA team and DOE management) identified numerous opportunities for improving readability by clarifying, shuffling, reorganizing, and, in some instances, deleting text. Specifically, DOE deleted passages to eliminate: 1) redundancies, 2) unsupported or overstated conclusions, 3) inappropriate value-laden language, and 4) unnecessarily complex language. The fact that redundancies should be minimized needs no elaboration. The importance of the other criteria for deleting text and examples are discussed below.

The quote that appears at the top of page 3 of the Congressional letter of October 20 provides an example of an unsupported statement that appeared in working drafts of the methodology report. This paragraph was properly deleted because it could not be supported by the results of the MUA. Because the MUA compared the sites on an individual basis rather than as portfolios, it is not possible to conclude from it alone what set of three sites should be characterized. In addition, several statements in the deleted passage contained value-laden remarks, such as a conclusion that a difference was "substantial." Other examples of value-laden words that were generally deleted or modified are "significant" and "reasonable." We believed that value judgments about the significance of the results were best left to the Secretary as the decisionmaker and that such judgments should appear in the recommendation report, not in the MUA. In sum, this paragraph and similar deleted passages overstepped the bounds of the role of the decision-aiding methodology.

An example of unnecessarily complex language that was deleted appears on page 29 of the staff memorandum. The deleted passage appeared in the conclusions section of Chapter 4, the preclosure analysis of the sites, and concerned the probability for a significant correlation in total costs among the sites. The passage was deleted because it seemed out of place inasmuch as the section was intended as a summary of conclusions. This detailed, technical point had been covered earlier in the main text of the chapter.

In summary, the central contention of the Congressional letter and staff analysis is false. A cursory comparison of language in early drafts of the methodology report against the final report shows that, in most cases, verbatim language, or language very similar in substance, was retained. Deletions were made for proper and legitimate reasons. Such facts lend no credibility to the Subcommittee's comments related to tailoring the final methodology report to suit a predetermined choice of sites.

Comment 3: DOE biased weighting factors in the MUA to promote the selection of the Hanford site.

This comment is without foundation. In fact, great care was taken to safeguard against bias and manipulation of the methodology. First, by judicicus selection of people, DOE ensured that no individual providing input to the methodology had any professional or economic incentives for the selection or rejection of a particular site. All judgmental inputs were the joint responsibility of many individuals, thereby diluting the influence of any single individual and creating a situation where individual bias would be apparent through comparisons across individuals. Second, care was taken to maintain separation between individuals making scientific judgments (e.g., probabilities of disruptive scenarios) and those making policy or value judgments (e.g., weighting factors). Such a division of labor is recommended by the National Academy of Sciences* and in the professional decision-analysis literature.

Third, formal state-of-the-art assessment techniques designed to minimize bias were used to obtain inputs to the methodology. These assessments were highly detailed and disaggregated, so much so that a computer was required to aggregate and analyze the implications of individual assessments. As a consequence, at the time at which the assessments were made, the implications for overall rankings were very difficult for the individuals providing the judgments to determine. Finally, all judgments were required to be supported by an explicit logic. Particularly controversial judgments, such as value tradeoffs between dollars and fatalities, were compared whenever possible with the values recommended for or implied by other Federal-agency decisions.

Thus, while it is true that an individual biased toward or against a site might have an idea how to alter any given judgment to manipulate results, the above safeguards would minimize the effect as follows:

- The requirement that all judgments be justified in terms of logic and information in the Environmental Assessments (EAs) limits the extent to which any input could be successfully biased.

- Due to the complexity of the MUA model it would be extremely difficult for a participant to know which of his inputs, if biased, would have an effect on conclusions.

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*National Research Council, 1983. *Risk Assessment in the Federal Government: Managing the Process*, Commission on Life Sciences, National Academy of Sciences, Washington, D.C.

- Due to the extensive opportunities for crosschecking to identify inconsistencies, any bias in judgments would have to be kept small to avoid making those biases obvious to other participants.

- Since any individual provided only a small fraction of the necessary inputs, that person's ability to influence conclusions would be small.

Finally, in further support of this position, we note that the BRWM/NAS said they saw no indication of bias in DOE's implementation of the methodology (see April 10, 1986, letter from F. Parker to B. Rusche).

Comment 4: DOE, in disregard of its own siting guidelines, arbitrarily disregarded siting factors such as total costs in an effort to promote the Hanford site.

The available evidence clearly indicates that DOE disregarded no siting factors in making the site-recommendation decision. To the contrary, the Secretary considered the full range of results and insights derived from the application of the methodology, one of which was that costs dominated whenever individual factors were aggregated. The result that costs would so completely dominate the overall rankings of sites was initially surprising and, frankly, somewhat unsettling as these costs must be regarded as very preliminary, at best. This point deserves some elaboration.

The cost estimates assumed in the methodology report are based on the current report on the total-system life-cycle costs. Although this was the best information available at the time, these estimates were considered more indicative than substantive because they are based on preconceptual repository designs. Moreover, these preconceptual designs are for a first-of-its-kind engineering project. These factors suggest a high potential for major design changes, with concomitant shifts in cost estimates. For example, cost estimates for the salt sites have assumed contemporaneous waste emplacement and backfill, thereby shortening by many years the repository-operations period relative to the Hanford site. (The long operations period assumed for the Hanford site is a significant contributor to its undiscounted cost.) If such an assumption were disallowed by the NRC, the cost estimates for the salt sites would increase significantly, perhaps even above those for Hanford. Very recent cost information still under review in OCRWM confirms the potential for major swings (upwards of a billion dollars) in repository costs.

Such basic and unpredictable system-design factors as these led the Secretary to temper consideration of costs with other considerations. Discomfort over the dominant effect of costs on the MUA results was apparently shared by the BRWM/NAS. In their letter of April 10, 1986, to the Director, OCRWM, they stated:

> "On the basis of the Board's review of the application to a single site, it appears that the expected total repository and transportation costs will have a major, if not controlling, effect on the rankings under pre-closure factors. This recognition of the heavy dependence on cost reinforces the Board's judgment that the principal usefulness of the multi-attribute utility method is to illuminate the factors involved in a decision, rather than to make the decision itself." [Emphasis added.]

Not only were all factors considered in making the decision, but they were accorded their proper weight consistent with provisions of the siting guidelines. The relative importance provisions in the siting guidelines are qualitative and reflect general perceived values of society. This is in contrast to the quantitative information required for the MUA. DOE gave operational meaning to the qualitative guidance by ensuring that value tradeoffs -- judgments of relative importance -- be consistent with a conservative philosophy in which costs are among the least important and public health and safety are most important. Such an approach is consistent with the guidance from the BRWM/NAS and from other independent reviewers of the methodology (see letter dated December 20, 1985, from M.R. Sampson and R.\Jim, Yakima Indian Nation, to B. Rusche).

In summary, all factors specified by the siting guidelines were considered by the Secretary in making the site-characterization decision. This position is supported by other outside reviewers of the methodology and recommendation reports (see pg. 2 of letter, dated November 6, 1986, from F. Parker to Congressman J. Weaver).

Comment 5: DOE deliberately did an incomplete multiattribute utility analysis for fear that a complete analysis would not support the selection of the Hanford site.

We discuss here two aspects of this comment: (a) the omission of explicit consideration of nonfatal health-and-safety impacts in the MUA, and (b) the decision not to perform an additional portfolio analysis to take into account rock-type diversity.

Consideration was given to nonfatal health-and-safety impacts in Section 4.6.4 of the methodology report. As explained in the report, the effect of including nonfatal impacts would be to give greater weight to the health-and-safety related objectives relative to the other objectives. Just such a sensitivity analysis is described in Chapter 4 of the methodology report (see Table 4-16), where it is argued that the inclusion of such impacts would not change the overall ranking of sites (although the spread between sites changes) because of the overwhelming dominance of costs.

With regard to the judgment not to perform the additional portfolio analysis needed to consider the effects of rock-type diversity, we acknowledge that such an analysis might possibly have provided additional insights about the relative desirability of portfolios of three sites. As in any formal siting study, decisions had to be made about what and what not to include in the formal analysis. It was our judgment that the extra time, cost, and effort necessary to perform a formal portfolio analysis was not required to make a responsible decision. A rigorous, formal evaluation of the effects of diversity would require a more complex form of analysis involving highly speculative judgments about such things as future licensing actions. Instead, we considered the portfolio effects qualitatively, as is commonly done in other portfolio-type problems. We believe such an approach is entirely consistent with the Act and the siting guidelines.

Professor Ralph L. Keeney, who participated in the development of the MUA, has on his own initiative recently conducted a partial portfolio analysis.* While we disagree with the conclusions and recommendations Professor Keeney derives from his new analysis, we believe it supports the long-standing principle that diversity should be an important factor in siting. Furthermore, we believe that the results of the analysis support our conclusion that a formal portfolio analysis would not yield major new insights that would lead to a different choice of sites.

Related to this point is the role diversity played in the decision to select Hanford for characterization. It is clear from the Congressional letter that this role was misunderstood. Consideration of the potential benefits of diversity was certainly a factor in the decision. Although the arguments for diversity have traditionally been along the lines of avoiding common-mode failure during the postclosure period, we believe the potential advantages to be far broader in scope. For example, characterizing sites in diverse geologic environments increases the likelihood of being able to consider later in the siting process a wider range of repository-design alternatives and innovative ways to ensure compliance with regulatory requirements than would otherwise be possible. Examples are whether and when to backfill repository openings and ways to ensure that retrievability requirements can be met.

However, diversity was not the only factor. The facts that there is no practical difference in the excellent predicted postclosure performance of the five sites and that the preclosure ranking is dominated by costs were also important. Diversity considerations confirmed that the set of three sites offered on balance the most advantageous combination of characteristics for successful development of repositories, as required by the siting guidelines.

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*R.L. Keeney, November 1986, "An Analysis of the Portfolio of Sites to Characterize for Selecting a Nuclear Repository," University of Southern California Decision Analysis Series.

Comment 6: DOE deliberately ignored advice from the Board on Radioactive Waste Management of the National Academy of Sciences in doing the multiattribute utility analysis and in making the site-recommendation decision.

We address here three parts to this comment: (a) DOE ignored the BRWM/NAS by allowing the siting guidelines to distort the weights accorded each siting factor; (b) DOE ignored the BRWM/NAS recommendations involving participation of outside experts; and (c) DOE ignored consideration of the relative vulnerability of the accessible environment at each site. DOE did not ignore these or any of the recommendations of the BRWM/NAS. Rather, DOE considered all recommendations very carefully, and, in fact, made many changes to the methodology and recommendation reports in response to these recommendations. It is true, however, that for various reasons, DOE decided not to follow all of the recommendations of the BRWM/NAS regarding the MUA, as explained below.

DOE did not allow the siting guidelines to distort the weights accorded siting factors in the MUA. The relative importance provisions in the siting guidelines were interpreted qualitatively, and were reflected in the analysis by ensuring that the quantitative value tradeoffs required by the MUA were consistent with a conservative philosophy that reflected general values of society. As discussed above, this did not involve eliminating costs from the analysis.

With regard to the merits of including outside experts in its implementation of the methodology, we recognize that the use of such people might have enhanced the credibility of the process. DOE decided not to directly involve outside experts in its implementation of the methodology for the following reasons:

1. DOE recognized from the outset the controversial nature of some of the judgments required as input to the methodology, for example, weighting factors. Accordingly, DOE performed numerous sensitivity analyses to examine how the site evaluations depended on the inputs to the model. These analyses roughly approximate differences in opinions and values of different groups and stakeholders interested in repository siting.

2. DOE staff and consultants were among the best qualified for providing the types of information required by the methodology. Further, DOE has the responsibility and the authority for making these judgments pursuant to the Act.

3. Other stakeholders have had several opportunities to influence the implementation of the methodology, albeit indirectly, by their involvement in the development of the siting guidelines and by reviews of the simple ranking methods presented in the draft EAs. Public-comment periods and rounds of consultation with interested parties on these documents did much to influence the specification of both the siting objectives and the value tradeoffs among objectives used in the methodology, which are the fundamental building blocks of the methodology.

4. Pursuant to requests from the public and the Congress, DOE did elicit an independent review of the methodology and its application from the BRWM/NAS. While this group said they were disappointed DOE did not involve outside experts, they also said they saw no indication of bias in DOE's implementation of the methodology.

In view of these factors, DOE did not directly involve all possible stakeholders. We believe this action balanced the requirements of the Act for State and public participation in the siting process against the requirements of the Act to continue to make timely progress toward repository development. Moreover, given the extensive sensitivity analyses, we doubt that the involvement of outside experts would have provided fresh insights into the MUA.

The last part of the comment concerns the idea that DOE should have considered the relative vulnerability of the accessible environment at the various sites. The concept of setting regulatory limits for releases of radioactivity to a universally applied accessible environment rather than for the predicted consequences of those releases is fundamental to the final Environmental Protection Agency's rule for disposal of nuclear waste. This rule was the subject of frequent interactions with the public and with independent scientific groups, including the BRWM/NAS, and took almost nine years to develop. A study* published in April 1983 by a special panel of the BRWM was critical of the radiation-release limits approach of the then-proposed EPA rule; the panel advocated instead an individual-dose limits approach. Although the EPA eventually added an individual-dose limit to its now-final rule, the release-limits approach is still the mainstay of the rule. EPA's rationale for emphasizing estimates of amounts of radioactivity released rather than individual exposures is that it avoids highly speculative predictions of future environmental pathways, behavioral patterns, and population distributions that determine how releases result in doses received by people. Such an approach will make demonstrations of compliance with the standards more straightforward. DOE as well as a special Science Advisory Board to the EPA generally agreed with these technical aspects of the standards.

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*National Research Council, 1983. A Study of the Isolation System for Geologic Disposal of Radioactive Wastes. Report of the Waste Isolation Systems Panel, Board on Radioactive Waste Management, Commission on Physical Sciences, Mathematics, and Resources, National Academy of Sciences, Washington, D.C.

Consistent with past DOE positions and with these regulations, DOE adopted a postclosure performance measure based on releases, not health effects. Not surprisingly, the BRWM/NAS disagreed with the measure, as it is the same as the EPA's. While the BRWM/NAS understood the DOE's position on this difficult issue, it advised that by ignoring current differences in accessible environments the DOE was ignoring a potentially important site discriminator. DOE agreed to consider differences in accessible environments only so far as such consideration was consistent with the EPA rule, and to do so in the final recommendation report.

Accordingly, DOE reviewed estimates of releases to the accessible environments at the various sites and observed that such releases are not expected to discharge to the Earth's surface or to surface-water bodies during the next several thousand years (see pg. 4 of recommendation report). Thus, differences in accessible environments among the sites are not discriminating.

Comment 7: DOE deliberately ignored other information, outside of the multiattribute utility analysis, potentially damaging to the Hanford site.

Early in the process of documenting the methodology, DOE considered whether to include "other information," for example, risk of disqualification, in what became the methodology report. Before the decision regarding the inclusion of this information was made, rough drafts of this "other information" section, written by DOE consultants, were circulated to a few DOE people for review. On review of these materials, it became clear that all factors identified as "other information" had already been or were being addressed adequately in the EAs, the methodology report, or the recommendation report. Therefore, to avoid double-counting, these other factors were not considered again in a separate chapter.

QUESTIONS FROM SENATOR JOHNSTON

QUESTION 3d: The States cite an internal DOE memo which describes DOE's site ranking report as "blatantly manipulating" data and forcing the methodology "to spit out the proper sites." Is this true? Please respond.

ANSWER: Several points of clarification should be made in regard to the referenced "internal DOE memo." The document was not a memo but rather simply personal notes on a working draft of the recommendation report. The author expressed a personal opinion concerning certain aspects of the working draft.

These points are elaborated on in the letters to Congressmen Markey, Swift, and Wyden from B. Rusche, included as an attachment to the response to question 3c. These concerns were resolved in the development of the final recommendation report published as DOE/S-0048.

QUESTIONS FROM SENATOR JOHNSTON

QUESTION 3e: The States and Indian Tribes cite DOE draft documents and experts' conclusions that the Richton Dome site should have been selected over the Hanford site.

Please explain why Richton Dome was not selected.

-- Please explain how Hanford was selected as one of the top three sites if it was ranked fifth out of five in the composite analyses for both preclosure and postclosure performance.

ANSWER: Language in draft documents that recommended the Richton Dome site was deleted because it was inappropriate to the purpose and competence of the multi-attribute utility analysis (MUA). Frankly, such conclusions reflect some overzealousness on the part of the writers. The purpose of the MUA was to illuminate the relative advantages and disadvantages of the nominated sites, not to exclude or include sites for the final set selected for characterization. This limited role of the MUA was appropriate because the MUA did not take into account all of the factors involved in the decision, most notably the potential benefits of diversity of rock type. Furthermore, the MUA provided only an approximate simplification of a complex reality. For example, uncertainty in the cost estimates is likely to be greater than assumed in the MUA.

The basis for the selection of sites for characterization, including an explanation of why

ANSWER 3e: (Cont'd)

Richton was not selected, is documented in the Secretary's recommendation report (DOE/S-0048, May 1986). Briefly, the recommendation report explains that, with respect to postclosure performance, all sites perform exceedingly well and that they are virtually indistinguishable in terms of desirability. With respect to preclosure factors, Deaf Smith is preferred to Richton Dome in the important category of impacts to the public and workers at or near the site. Richton Dome's ranking in several preclosure categories of concern also tends to vary more than Deaf Smith's. In addition, the uncertainty and timing of costs were considered in determining that Deaf Smith was preferred to Richton Dome for site characterization.

The choice of the Hanford site, in view of the results obtained with the MUA, is best explained in light of the role of the MUA in the site-recommendation decision.

The site-recommendation decision was one of selecting a portfolio of sites for characterization. That is, the decision was to select a set or portfolio of sites that, as a set, offered the best prospects for the successful

ANSWER 3e: (Cont'd)

development of a repository. The MUA used to aid the decision evaluated the overall desirability of individual sites, not the desirability of the sets of the sites. Accordingly, the three sites that comprise the best set for characterization will not necessarily be the same three sites that rank at the top when the sites are considered individually once the portfolio effects are taken into account. For example, the three salt sites appear most desirable in terms of expected postclosure performance. However, selecting three salt sites would not be prudent, even if it were allowed, because of the possibility that a problem could be discovered with salt as a host rock, which could disqualify all three sites at once.

With this background in mind, we now discuss how Hanford was selected even though it ranked fifth in the composite anlaysis. As explained in the recommendation report, Hanford is expected to perform extremely well during the postclosure period, and postclosure performance is the most important factor of DOE's siting criteria. Hanford is also expected to perform adequately on all preclosure factors as well, including, for example, preclosure radiological safety. When all

ANSWER 3e: (Cont'd)

preclosure factors are aggregated, Hanford ranks fifth. However, this last-place ranking is governed almost entirely by repository-facility and transportation costs. The current estimates of repository and transportation costs are very uncertain because of uncertainty about the overall waste-management system and may, therefore, be an inappropriate basis for siting decisions made at this time. A geologic repository is a first-of-its-kind engineering task, and it is wise to be modest about our ability to predict the ultimate design that will emerge at the end of the licensing process, which is also a first-of-its-kind enterprise. Such considerations led the Secretary to temper consideration of costs with other considerations, particularly since costs are to be among the lead important considerations, according to the Siting Guidelines.

If costs are not allowed to dominate preclosure considerations, the selection of Hanford indeed appears to be quite favorable. Hanford appears to be the most preferred site in the important category of local site impacts, in contrast to the Richton Dome site.

ANSWER 3e: (Cont'd)

Diversity of rock type also played a significant role in the selection of the Hanford site. Indeed, it is a central theme of the siting provisions in the Act itself. Although the arguments for diversity have traditionally been along the lines of avoiding common-mode failure during the postclosure period, we believe the potential advantages to be much more broad in scope. For example, characterizing sites in diverse geologic environments increases the likelihood of being able to consider later in the siting process a wider range of both repository-design alternatives and innovative ways to ensure compliance with regulatory requirements than would otherwise be possible. Examples include whether and when to backfill repository openings and ways to ensure that retrievability requirements can be met.

QUESTIONS FROM SENATOR JOHNSTON

QUESTION 3f:	Hanford is ranked last on postclosure analyses, last on preclosure health and safety, and last on cost. Hanford is ranked first only on environmental and socioeconomic impacts. DOE has stated that when costs are discounted, Hanford moves up in the overall ranking. Please explain how this is possible.
ANSWER:	DOE did not state that when costs are discounted, Hanford moves up in the overall ranking. What is stated is that the relative differences among the sites are reduced sharply when the time value of money is taken into account. That is not to say that the overall ranking changes; indeed, Hanford remains the fifth-ranked site when costs are discounted and all other siting factors defined for use in the MUA are aggregated. As explained in the previous response, however, there is no a priori reason for concluding that the three sites that rank at the top when the sites are considered individually should necessarily make up the best set of three for characterization when diversity is taken into account. The Recommendation Report does state: "While it [Hanford] is ranked fifth when all of the preclosure objectives are aggregated, it is clear that this ranking is driven by the significantly higher expected costs. In fact, if all preclosure objectives except repository and transportation costs are aggregated, Hanford becomes the most

desirable site, a telling factor given the low relative importance assigned by the siting guidelines to costs."

QUESTIONS FROM SENATOR JOHNSTON

QUESTION 3g: DOE cites rock diversity as an important factor in the selection of three sites for characterization.

-- Why is it that rock diversity was not included in the factors incorporated into the ranking methodology?

-- Isn't it true that rock diversity weighed fairly heavily in the final selection of the Hanford site?

-- If this is so, shouldn't this factor have been considered equally with all other factors and shouldn't it have been included in the ranking methodology from the start?

ANSWER: Some clarification is needed about how rock-type diversity would be analyzed formally. Diversity could be accounted for by conducting what is known as a "portfolio analysis." This is a complex and difficult form of analysis in which all possible combinations of sites, with each possible combination considered as an alternative, would be evaluated. Such an analysis would have required input regarding highly speculative judgments about such things as future licensing actions. Thus, a comprehensive portfolio analysis would not be a simple extension of the MUA, and would have required considerably more time, cost, and effort.

It was our judgment that the extra time, cost, and effort necessary to perform such an analysis was not required to make a responsible decision. Instead, we decided to consider the portfolio effects qualitatively, as is commonly done in other portfolio-type problems. We believe such an approach is entirely consistent with the Act and the DOE siting guidelines.

It is true that diversity "weighed fairly heavily" in the decision to select the Hanford site. This is not to say that diversity was the only factor, however. The excellent predicted postclosure performance and the dominance of costs were also important factors.

That diversity should be afforded considerable weight is consistent with the Act. The principle of seeking diversity in types of rock is a central theme of the siting provisions in the Act (Sections 112(a) and 113(a)); it has been part of the geologic repository program since its inception.

QUESTIONS FROM SENATOR JOHNSTON

QUESTION 3h: If all five sites were ranked as closely on postclosure analyses as DOE has testified, does the ranking methodology really serve to effectively discriminate among sites?

-- If not, what is the purpose of the methodology?

ANSWER: As it turned out, the ranking methodology did not discriminate significantly among sites in the category of postclosure performance. However, this is in no way a weakness of the methodology, as explained below.

The methodology is designed to discriminate among sites for which there exists a reasonable basis for discrimination. It is not designed to discriminate artifically among sites, nor to create a discrimination where none exists.

Specifically, with regard to estimates of postclosure performance of the five nominated sites, this means that because expected releases are so far below the limits defined by the regulatory agencies, all sites score above a 99 on a scale where a 0 is the minimum level and 100 is perfection. Although this finding does not serve to effectively discriminate among sites, it is nonetheless a significant insight from the analysis. It indicates that all sites appear more than adequate when compared against the exceedingly stringent regulations for releases to the accessible environment. In addition, the use of methodology did much to answer criticisms of the draft EA ranking methods made by the NAS's Board on Radioactive Waste Management.

QUESTIONS FROM SENATOR JOHNSTON

QUESTION 4: Site Selection Guidelines

a. DOE's site selection guidelines were published in December 1984, just before DOE issued draft environmental assessments, narrowing the nine potential repository sites to three sites in Washington, Nevada, and Texas.

-- Please explain how the guidelines were used to select the three sites.

-- Were the guidelines used?

-- Could any of the nine sites have been eliminated by the guidelines?

What is the purpose of using the guidelines if none of the nine sites could have been eliminated anyway?

-- Were the guidelines structured so that all nine sites already under consideration would be found acceptable, as the States have charged?

ANSWER: The siting guidelines (codified as 10 CFR Part 960) most emphatically were used to select sites for characterization, as follows.

The guidelines, in 10 CFR Part 960.3-2-2-2, require the DOE to implement a multi-step process in selecting sites for nomination as suitable for characterization from among the potentially acceptable sites. Very briefly, this process involved the evaluation of the potentially acceptable sites in terms of the disqualifying conditions in the guidelines; selection of a preferred site in those geohydrologic settings containing more than one site; evaluation of each preferred site within a geohydrologic setting under the qualifying conditions of the guidelines; and performing a reasonable comparative evaluation of the sites.

Draft environmental assessments for each of the nine sites were prepared to document the process specified above. Some 20,000 comments were received, and among them were many comments on the three simple ranking methodologies used to tentatively narrow from five sites to three sites. Final EAs to accompany the formal site nominations of the five sites were prepared on consideration of all of the comments on the draft EAs. Decisions to apply a formal decision-aiding methodology, to prepare a separate report detailing that analysis, and to seek independent review of the methodology were largely made in response to the comments on the draft EAs.

The methodology report presents a detailed comparison of the advantages and disadvantages of the five nominated sites. As an introduction to that comparison, in Chapter 2 of the report, DOE explains the relationship between the methodology and the siting guidelines. Very briefly, the report explains that the system and technical guidelines are reflected in the various objectives defined for use in the methodology. The overall desirability of a site is related to the extent to which the site achieves these various objectives. The specific factors that influence a particular site's achievement of objectives are derived from both the favorable and potentially adverse conditions associated with the technical guidelines. These specific factors are depicted graphically in diagrams known as influence diagrams, which in turn, were used in the site scoring process.

Finally, the implementation guidelines were also used in selecting sites. These guidelines govern the application of all other guidelines in the evaluation of sites and establish general rules to be followed during siting. Of particular relevance here are the implementation-guidelines requirements that give primary significance to postclosure guidelines and secondary significance to preclosure guidelines, and, that select sites to the extent practicable in a diversity of geohydrologic settings and rock types.

With regard to questions about whether the guidelines could eliminate any of the nine sites identified as potentially acceptable, the answer is yes. The guidelines were not structured so that all nine sites already under consideration would be found acceptable.

The purpose of the guidelines is stated in Section 112(a) of the Act. The guidelines are to specify "detailed geologic considerations that shall be primary criteria" for site selection; the Act also requires the guidelines to specify "factors that qualify or disqualify any site from development as a repository" and lists the factors to be included.

The final DOE siting guidelines fulfill the requirements of the Act. In addition, the guidelines were developed from other sets of site performance criteria defined for geologic repositories by the National Academy of Sciences, the International Atomic Energy Agency, earlier programs in the United States, and existing and applicable regulations promulgated by the NRC and the EPA.

Moreover, in addition to integrating these various sets of siting criteria developed over a period of 10 years, the final guidelines were promulgated after two formal public-comment periods and two rounds of consultation with the interested States. Numerous changes were made to the guidelines in response to comments from the public, State consultants, and the NRC concurrence interactions. In this regard, it is important to note that many additional disqualifying conditions were added to the proposed and alternative guidelines as a result of the comment, consultation, and concurrence process.

QUESTIONS FROM SENATOR JOHNSTON

QUESTION 4b: The States and environmental groups have challenged the site selection guidelines in court.

-- If the courts find the guidelines invalid, what will DOE's contingency plan be?

-- Would an adverse court decision render the environmental assessments invalid?

-- Would an adverse decision render the selection of sites in Washington, Nevada, and Texas invalid?

ANSWER: The Department considers it unlikely that there will be any adverse court decision regarding the guidelines that could impact the conduct of the waste management program. There are, nevertheless, a number of issues before the court that question the sufficiency of the environmental assessments and the validity of the site selection decisions. The Department will determine the appropriate response to court decisions on these issues when those specific decisions are rendered.

QUESTIONS FROM SENATOR JOHNSTON

QUESTION 5: The Hanford Site

a. The State of Washington has expressed concern about certain adverse features of the Hanford site, particularly ground-water travel time and tectonic stability. The NRC staff recently echoed some of these concerns in comments on DOE's final environmental assessments. NRC said some of DOE's conclusions concerning Hanford are overly favorable or optimistic and may not have factored in uncertainties. NRC found some of the same problems in the draft environmental assessment.

-- What is DOE's response to the NRC staff comments?

-- What has DOE done, or what will DOE do, to resolve these issues prior to site characterization?

ANSWER: The potential for over-optimism and under-estimation of uncertainty was recognized throughout the process leading to the publication of final environmental assessments. Provisions in the DOE's implementation guidelines stipulate that reasonably conservative assumptions, which allow reasonable decisions to be made in the face of uncertainties, be employed to support the decisions that must be made in the various phases of the siting process. Before site characterization studies, the evidence (i.e., information, evaluation, assumptions, etc.) is not expected to provide the precise information required for licensing. But rather, the evidence is expected to provide a reasonable basis for assessing the merits or shortcomings of a site against the siting guidelines.

Despite our efforts to fairly and accurately represent current scientific judgments about such issues as ground-water travel time and tectonic stability, we appreciate that other technical experts would disagree with the Department's judgments. Current uncertainties leave much room for reasonable and knowledgeable experts to disagree. As the NRC observed, "At this stage of the site investigation and screening process there is inherent uncertainty in site information that can lead to alternative interpretations of data. Furthermore, resolution of uncertainties ... must await detailed site characterization."

DOE plans to address the NRC comments as the NRC suggested: "For consideration by DOE in the development of the Site Characterization Plans." The NRC will have the opportunity to comment formally on the adequacy of those plans. In an effort to prepare the NRC for receipt of the plans, advance copies of the geologic and hydrologic characterization plans will be made available to the NRC and interested States, Indian Tribes and parties. In addition, DOE will hold technical meetings with the NRC to discuss planning for and the results of site characterization. In the course of such technical discussions with NRC, DOE will discuss alternative interpretations, uncertainties, and means to resolve them in determining a site's suitability for development as a repository.

QUESTIONS FROM SENATOR JOHNSTON

QUESTION 5b: According to an article by Luther Carter in Issues in Science and Technology the total estimated cost for the Hanford site is $12 billion in 1985 dollars, $4 billion more than for Richton Dome and $5.4 billion more than for Yucca Mountain. Please provide the Committee with up-to-date estimates of these costs for each of the five sites nominated for the first repository. Include a breakdown of these costs showing the most significant cost items. Which estimated costs have increased since the enactment of the Nuclear Waste Policy Act of 1982? Why have these costs increased?

ANSWER: The article in Issues in Science and Technology was based on cost estimates prepared for the Department's report entitled "A Multiattribute Utility Analysis of Sites Nominated for Characterization for the First Radioactive-Waste Repository-A Decision-Aiding Methodology," May, 1986. No subsequent cost estimates have been developed for the five nominated sites. Cost estimates for the three candidate sites are currently being completed in connection with the upcoming analysis of the adequacy of the fee.

The breakdown of the costs that was used in the Department's report is provided below. The only major increase in these cost estimates, relative to the estimates developed when the Nuclear Waste Policy Act was enacted, occurred in the estimated cost of operations. In addition to an increase for inflation, estimates for operating costs increased due to the addition of a 24-year caretaker period following the last waste emplacement with continuing performance confirmation and monitoring activities, addition of performance confirmation during the entire 50-year operating period, operation of two (versus one) waste handling buildings, and use of a site-specific waste package with high Quality Assurance standards.

Repository-cost estimates
(Billion of 1985 dollars)

	Site				
Cost category	Davis Canyon	Deaf Smith	Richton	Hanford	Yucca Mountain
Development and evaluation	1.6	1.6	1.6	1.6	1.5
Construction					
Surface	1.7	1.2	1.2	1.6	0.8
Underground	0.8	0.8	0.7	1.3	0.4
Subtotal	2.5	2.0	1.9	2.2	1.2
Operation					
Surface	3.1	2.7	2.6	3.6	3.0
Underground	1.9	2.0	1.7	4.0	1.2
Waste Package	1.0	1.0	1.0	1.3	0.5
Subtotal	6.0	5.7	5.3	8.9	4.7
Closure and decommissioning					
Surface	0.2	0.1	0.1	0.1	0.1
Underground	0.1	0.1	0.1	0.1	0.0
Subtotal	0.3	0.2	0.2	0.2	0.1
Total					
Development and evaluation	1.6	1.6	1.6	1.6	1.5
Surface	5.0	4.0	3.9	4.6	3.9
Underground	2.8	2.9	2.5	5.4	1.6
Waste Package	1.0	1.0	1.0	1.3	0.5
Total	10.4	9.5	9.0	12.9	7.5
Uncertainty band					
-35%	6.8	6.2	5.9	8.4	4.9
+35%	14.0	12.8	12.2	17.4	10.1

QUESTIONS FROM SENATOR JOHNSTON

QUESTION 5c: This same article claims that drilling 15-foot diameter shafts in basalt at Hanford to depths of more than 3000 feet represents "a feat beyond the demonstrated State of the Art".

-- What is your response? Is the construction of the shafts needed to open the repository within the demonstrated State of the art?

-- Have shafts this size ever before been drilled to such depths in rock of the hardness of basalt?

-- What was the result of the attempt in 1983 to drill a deep 14-foot diameter shaft at the Agnew nickel mine in Australia? What are the lessons of this experience for the proposed repository at Hanford?

ANSWER: Current technology would enable the proposed shafts at Hanford to be drilled successfully. For example, a shaft to comparable size (14' diam.) at Agnew Nickel Mine, Australia, was completed in 1983 to a drilled depth of 2460' in rock of equal or greater hardness as Hanford. Other shafts of slightly smaller diameter have been drilled to much greater depths:

1. Shaft UC-3, 120" diam., Central Nevada, 1968, completed by Department of Defense (DOD) to a depth of 5600'.
2. Shaft UC-4, 120" diam., Central Nevada, 1968, completed by DOD to a depth of 4000'+.
3. Shaft UA-1, 90" diam., Amchitka Island, Alaska, 1967, completed by DOD to a depth of 6150' and penetrating some basalts.

The rock found in The Agnew Nickel Mine was at least as hard as the Hanford basalts and had a much

ANSWER 5c: (Cont'd)

less favorable Drillability Index. In addition, shafts have been drilled in rock with unconfined compressive strengths as high as 115,000 PSI as compared to a range of 30-60,000 PSI for the Hanford Basalts.

The Agnew shaft was drilled with a prototype drill rig that had never before been tested. The hole cost approximately twice the original estimate, and took twice the original schedule to complete, but it nevertheless was completed, and was functional. Many problems were encountered which can be summarized as follows:

1. The drilling rig was poorly designed for the application, both structurally and operationally.
2. Poor maintenance practices were followed.
3. The drilling rig operators were not experienced.
4. The lubrication system for the cutter head was not effective, and the mud circulation system was poor.
5. Poor instrumentation caused poor operational control.
6. Contract inadequacies provided no incentive for the contractor to drill efficiently.

ANSWER 5c: (Cont'd)

All of the above problems are lessons for Hanford, and all have been incorporated into current project planning. The Hanford drilling rig is a completely different and proven design, and will be operated by experienced personnel using approved procedures.

REFERENCES

1. Smith, Raymond M., Field Inspection Report No. 2 on Blind Shaft Drilling at the Agnew Mining Company Nickel Mine, Western Australia, U.S. DOE report prepared by RKE/PB, January, 1983.
2. Fenix and Scission, Inc., UA-1 Hole History, report prepared for Department of Defense, November, 1969.
3. Kaesehagen, F. E., Blind Shaft Drilling - State of the Art, report by the Australian Mineral Industries Research Association, October, 1979.
4. Morrison-Knudsen Co., Inc., Large Shaft Development Study, report SD-BWI-ER-007, prepared for Rockwell Hanford Operations, March, 1984.
5. Morrison-Knudsen Co., Inc., Assessment of Conducting a Large Shaft Demonstration Test Utilizing Geodril Rig-32, report SD-BWI-ER-008, prepared for Rockwell Hanford Operations, January, 1985.

QUESTIONS FROM SENATOR JOHNSTON

QUESTION 5d: According to the same article (in Issues in Science and Technology by Luther Carter) "DOE's assertion that a Hanford repository would far exceed the Environmental Protection Agency's performance standards is not supported by available data, which, according to the U.S. Geological Survey, are 'insufficient to conclude much of anything with regard to groundwater travel time or direction'."

-- Is this accurate? Please discuss.

-- Has the USGS commented on the issue of engineering feasibility and the danger of flooding at the Hanford site? What were their comments? What is DOE's response?

ANSWER: With regard to the Department of Energy's (DOE) judgment that a Hanford repository would far exceed the Environmental Protection Agency's performance standards, the Department made every effort in its multi-attribute utility analysis (MUA) to fairly and accurately represent current scientific judgments. Despite this, it appreciates that there may be those who disagree with the specific estimates provided by the Department's technical specialists. Current uncertainties leave room for reasonable and knowledgeable experts to disagree. The conclusion from the MUA analysis is that all of the five sites analyzed would, with very high probability, meet EPA limitations on postclosure radionuclide releases with a substantial margin of safety. Thus, even if more pessimistic estimates prove accurate, there is still assurance that the sites selected for characterization will, from the standpoint of meeting EPA release requirements, provide excellent alternatives for the final choice of a repository site.

With regard to the utility of available data for estimating groundwater travel time and flow direction, the Department has taken into consideration important uncertainties in the data through extensive additional probability analyses since issuance of the draft Environmental Assessment commented on by the USGS on March 6, 1985. The methods and results of that probability analysis on which current estimates of groundwater travel time are based are reported in the final EA on the Hanford Site published in May 1986. The analysis was based on hydraulic data derived from approximately 200, mostly single-well, aquifer tests at about 35 well sites irregularly distributed areally in the vicinity of the proposed repository site. The test facilities and test results are of variable quality and cover wide ranges of values. Individual tests for the most part represent those hydraulic characteristics in near proximity to the test well, thereby limiting the areal distribution and comprehensiveness of the data base. However, good quality groundwater level data for defining flow direction laterally and vertifically beneath the proposed repository site was derived from a grouping of three nested prizometers at the site. On the basis of stochastic analyses of the available data, taking into account uncertainties in the ranges of parameter values, the Department judges that groundwater travel time and direction can be estimated within acceptable limits of probability for recommending sites for characterization. The hydrologic testing program planned as a part of site characterization is expected to provide data to reduce the level of uncertainty in hydrologic parameter values needed for ultimate performance assessment and licensing.

The USGS has commented at various times on issues relating to engineering feasibility and potential for underground flooding at the Hanford site. Examples include comments that may be cited from three different documents prepared by the USGS in 1983. These are:

1) Review comments by the U.S. Geological Survey on "Site Characterization Report for the Basalt Waste Isolation Project," DOE/RL-82-3, May 1983.

   - p.2, par. 6 lines 6-8 and p.3, par.1, lines 1-3 -

> "At the prevailing water pressures, fractured, breccated and pillowed zones could wash out, resulting in disastrous (perhaps even explosive) flooding in the mined passages which could be impossible to control initially by pumping. Such catastrophic failures could occur during construction and during waste emplacement operations making retrieval of waste difficult."

- p.3, par.2, lines 9-14 --

> "Should the pathway created by the breakdown of the fracture filling materials extend to a permeable zone in the basalt, the high differential hydraulic head could induce piping (flushing of the fracture filling material at a rapidly accelerating rate) which would increase the hydraulic conductivity of the fractures and provide another mechanism by which disastrous flooding of the repository could occur."

2) "Survey of Available Information with Respect to Sites Currently Under Consideration for Possible Development of a Repository for High-Level Radioactive Waste" submitted by the U.S. Geological Survey to the Honorable Richard L. Ottinger, Chairman, Subcommittee on Energy and Power, Committee on Energy and Commerce, U.S. House of Representatives, August 10, 1983, in response to written request by the Chairman dated May 3, 1983.

Enclosure 3 of 6, p.2, par.2, lines 9-12 --

> "The possibility of penetrating zones of greater permeability that would yield groundwater under high hydrostatic pressure must be considered in the plans for constructing a repository in basalt at Hanford."

3) Report on findings of a U.S. Geological Survey team of scientists on their visit on June 7-10, 1983, to the BWIP (Hanford) to review data collected to date by the DOE contractor and to attempt to assess the adequacy of this data base and planned future studies to characterize the

site -- transmitted under covering letter dated August 25, 1983, to Mr. Robert L. Morgan, Project Director, Nuclear Waste Policy Act Project Office, U.S. Department of Energy, Washington, DC 20585.

- p.1, par.4, lines 6-10 (Executive Summary) -

  > "Acknowledged high water pressures due to normal hydrostatic conditions and a recognized disadvantageous state of stress in a potentially fractured geohydrologic environment indicate potential hazards of principal concern that must be considered in the planning and engineering of a mined repository at Hanford."

- p.3, par.3 lines 1 and 2 and lines 5-8 -

  > "A major unresolved geologic issue is how to deal with unpredictable zones of potentially high vertical permeability in the repository host rocks.... If these zones were encountered in construction of a repository, they may present major construction problems because of the high hydrostatic water pressures in the surrounding aquifers."

- p.5, par.1, lines 1-3 and lines 8-10 -

  > "We feel that the planning and design of a repository in the Pasco Basin must anticipate that some highpermeability features of the types described will inevitably be encountered in an area the size of a repository.... These zones will contain water at high hydrostatic pressures and could potentially produce water at high flow rates."

The intent of the foregoing comments by the USGS was to draw attention to hydrogeologic conditions potentially existing at the Hanford site that the Department of Energy should make every reasonable effort to evaluate when characterizing the site for possible construction and operation of a repository. The expressed concerns were based on the limited data base available at the time, which nonetheless was sufficient to indicate the need to consider the potential problems cited by the USGS. Since that time, the Department in preparing the Environmental Assessment (see, for example, Volume III of final EA, pg. C.8-1) and design of the exploratory shaft facility, has continued to evaluate the existing data base to develop ranges of estimated groundwater inflow to underground workings so that it can deal with any inflow conditions that might reasonably be expected. To be prepared to deal with likely maximum inflows, the Department, as a phase of site characterization before Exploratory Shaft construction, is considering a plan to run a series of local and large-scale hydraulic stress tests at several horizons in the Grande Ronde Basalt at, above, and below the proposed repository horizon in the immediate vicinity of the planned Exploratory Shaft Facility (ESF). Such "pre-ESF" tests are expected to yield information that will contribute to the shaft design and operation of the ESF. Also, in the process of developing the underground workings of the ESF, various techniques such as advance lateral borings are planned for identifying possible high-flow zones ahead of actually mining out the tunnels and rooms needed for underground, in-situ tests, which are expected to provide appreciably more detailed information on the potential for underground flooding. In the meantime, evaluation of existing data by the Department indicates that the range in groundwater inflow rates considered likely is controllable by engineering measures with reasonably available technology.

QUESTIONS FROM SENATOR JOHNSTON

QUESTION 6: The Deaf Smith Site

a. Opposition to the bedded salt site in Deaf Smith County, Texas seems based on the fact that the shaft to the repository would pass through the Ogallala aquifer. Why isn't this a disqualifying factor for the Deaf Smith site?

-- What would be done to prevent pollution of the aquifer by radioactivity or by salt?

b. In testimony to the Committee, Governor Clements cites "salt creep" at depth as a major concern with the projected performance at the Deaf Smith site. Room closure due to creep in impure salt is cited as genuine difficulty in maintaining retrievability a specified in Nuclear Regulatory Commission regulations.

-- What do DOE's analyses of projected salt creep rates at the Deaf Smith site show?

-- What is DOE's response to these observations by Gov. Clements?

c. What has DOE learned about matter of salt creep, room closure, cracking and brine migration in salt repositories as a result of your work at the Waste Isolation Pilot Project? Please discuss in detail and provide a bibliography of relevant reports.

ANSWER 6a: In general, the presence of an aquifer between the host rock and the land surface is not a reasonable basis for a disqualifying condition. Such a condition would be far too restrictive and would unnecessarily disqualify most of the potential sites in the country. However, a site would be disqualified if repository construction, operation, or closure would significantly degrade the quality or significantly reduce the quantity of water from major sources of offsite supplies presently suitable for human consumption or crop irrigation and

ANSWER 6a: (Cont'd)

such impacts could not be compensated for, or mitigated by, reasonable measures.

The issue of whether this disqualifying condition existed at the Deaf Smith site was fully considered during the development of the final Environmental Assessment for the site. As explained in the final EA (see, for example, discussions on pps 5-60 to 5-63 of Volume 1, p. 6-55 of Volume II, and pgs. C.4-47 to C.4-48 in Volume III), the Deaf Smith site is not disqualified because only minimal impacts on water quality related to repository development are expected and repository-related water requirements represent a very small percentage (less than one-fourth of one percent) of the water supply in Deaf Smith County.

Pollution is generally caused by the escape and transference of some undesirable substance. The substances and processes involved can be either man-made or natural. Since the dominant direction of groundwater movement in the Permian Basin based on current information is to the southeast and downward, it is not likely that a source of pollution for the Ogallala aquifer would come from the repository.

Since the high-level waste to be handled at the repository is required to be in solid form (10 CFR 60.135 (c)(1)), an inadvertent release of material

ANSWER 6a: (Cont'd)

within the repository surface area would be readily detectable and recoverable. The current design for surface structures (SCP-CDR) has placed the salt storage pile on the surface in a location that minimizes wind blown dust. The site will collect and control surface storm water in a storm water pond and will collect runoff from the salt storage pile in a brine pond.

Transference of radionuclides from the subsurface structure of the repository to the Ogallala/Dockum aquifers is considered unlikely since the materials in question would have to move upward for 1500 ft. to reach the base of the Dockum Group. All shafts sunk through the aquifers will be fully lined to prevent operational flooding and will be fitted with multiple seals and plugs before decomissioning to prevent transport of radionuclides. These seals are also intended to prevent transfer of any brines upward from the salt portions of the stratigraphic section.

ANSWER 6b: For a depth of 785 meters, an extraction ratio of 23 percent, and a thermal loading of 15 watts per square meter, the room closure rates are projected to be of the order of 20 centimeters per year.

As stated in Volume 3 of the Deaf Smith County Site Environmental Assessment (DOE/RW-0069, pg. C.8-6):

ANSWER 6b: (Cont'd)

"Creep of salt applies to two retrievability issues, reexcavation of waste rooms and removal of canisters from emplacement holes. Even with early backfilling, substantial closure of waste rooms prior to retrieval operations is likely. In order to provide the room height needed for overcoring (if needed, see below) or for lifting waste packages from the holes, remining will be needed to remove some in situ salt, mostly from the roof, in addition to the consolidated backfill. Remining of backfill and in situ salt can be accomplish by the same techniques as original waste room excavation with the addition of needed cooling and, more intensive ground support measures.

If waste packages are placed in open holes, either with or without crushed salt backfill, the creep of the in situ salt is expected to close the airgap around the hole shortly after emplacement. The waste package is designed to withstand any stress resulting from the closure, but removal of the package, in this case, may require overcoring. This emplacement mode, however, is only the simplest of several contemplated by the DOE which include, but are not limited to, horizontal emplacement of one or more canisters in holes drilled into the pillar between rooms, the use of large holes without backfill, the use of steel or concrete sleeves to line emplacement holes, and combinations of these methods. The use of sleeves, for example, should eliminate concerns about the effect of creep closure on location and removal of waste packages in retrieval operations.

The EA describes only the simplest scheme for waste emplacement, i.e., a single row of vertical holes in the floor of the storage room with each hole containing a single vertically placed waste package surrounded by crushed salt. Creep of the in situ salt at elevated temperature surrounding the canister will reconsolidate the crushed salt and put a compressive stress on the waste package surface. This clamping action will prevent the retrieval of the waste form without either opening the waste package overpack or overcoring or reexcavating the waste package.

A variety of location techniques are available including surveying from permanent monuments located outside the high temperature area, metal detectors, radioactivity detectors, and earth penetrating radar, which, when used by themselves or the

ANSWER 6b: (Cont'd)

combination, can provide sufficiently accurate position data."

ANSWER 6c: The rates of salt creep, room closure, and brine migration are greater than the projected rates based on numerical modeling. Better predictions of salt creep will require a more thorough understanding of the deformation mechanisms of salt and their dependence on stress and temperature. Room closure is influenced by clay seams contained within the salt. Fluid migration is probably a result of brine migration from salt and water migration from the clay seams. Attempts to monitor cracking within the salt by use of acoustic devices have yielded inconclusive results. It is expected that microcracking in the salt around the periphery of a room could lead to higher rates of room closure.

QUESTIONS FROM SENATOR JOHNSTON

QUESTION 7: a. NRC recently identified concerns about overly optimistic assumptions made by DOE about hydrothermal activity contained in the final environmental assessment on the Yucca Mountain site. Similar concerns have been expressed by the State, and were identified by the NRC staff in comments on the draft environmental assessment in 1985.

-- What is DOE's response to the NRC staff comments?

-- What is DOE doing, or will DOE do, to resolve this issue prior to site characterization?"

b. Witnesses from Nevada have stressed that the Yucca Mountain is near the Nevada test site and that very little is known about the effect of nuclear weapons testing on the tuff formation that would be the host for the repository.

c. Gov. Sawyer referred to "a river of water" under the Yucca Mountain site. What does DOE know about this?

d. Gov. Sawyer also alleges that DOE has failed to establish an environmental baseline for Yucca Mountain, so that changes in the environment due to waste activities there cannot be measured.

-- Is this true? Please explain.

Gov. Sawyer also testified that DOE has been criticized by the NRC staff in six "important" technical areas:

1. active fault movement and reactivation of prior faulting by nuclear weapons testing;

2. hydrothermal activity that could affect waste containers uses there (sic);

3. ore deposits in the area that might cause future human intrusion;

4. over-reliance on geochemical effects to slow transport of radioactivity through the rock;

5. over-reliance on models of groundwater travel time in the unsaturated zone;

QUESTION 7: (Cont'd)

6. over-reliance on uncertain performance of engineered barrier systems.

What is your response to these comments?

ANSWER 7a: Hydrothermal alteration of the rocks at Yucca Mountain will be extensively studied during site characterization. Preliminary studies have shown that the alteration of rocks at the surface has taken place at temperatures less than 100°C. The hydrothermal alteration increases moderately with depth. The hydrothermal system that produced the low temperature alteration has been dated at 12 million years, and thus would not likely interfere with the functioning of a repository. In addition, the current ground water temperatures are less than 50°C and likely do not present a situation where a modern hydrothermal system would develop and interfere with the functioning of a repository. Many additional studies will be done during site characterization, including studies of degree, type, and timing of the alteration and studies on the current and possible future thermal regime at Yucca Mountain.

ANSWER 7b: It is important to point out that no surface or underground testing of nuclear weapons has occurred, or is anticipated to occur at any time in the future, within less than 23 km of the Yucca Mountain

ANSWER 7b: (Cont'd)

site. The effects of nuclear weapons testing on geologic formation properties and groundwater have been extensively studied for many years on the Nevada Test Site (NTS), for siting and analysis of weapons tests. From extensive pre- and post-shot investigations, it is known that formation damage and permanent perturbation of the groundwater system are confined to a limited zone (much less than 15 km) around the shot point. Facilities on the surface and underground are maintained in very close proximity to weapons tests and are undamaged. Thus there is no indication that this kind of permanent damage either exists at the Yucca Mountain site or will occur in the future as a result of nuclear testing at the NTS. Surface faulting in response to nearby weapons tests has been observed at Pahute Mesa and Yucca Flat, resulting in seismic activity along faults that approach 10 km in length. Some of the faults associated with induced seismic activity are similar to those at the Yucca Mountain site. However, there are several aspects of weapons test-related faulting activity which indicate that damage to the host tuff formation at Yucca Mountain is unlikely. The extent of faulting, the size of fault displacements, the magnitude of ground motion from induced faulting, and characteristics of the

ANSWER 7b: (Cont'd)

accompanying aftershocks all indicate that these faults may already have been near the failure point, and that the minor amount of slip was triggered by the nearby explosions. The release of natural stress by the explosions may actually reduce the probability of earthquake recurrence along these faults during the lifetime of the repository. Extensive monitoring has shown that the ground motion produced at the Yucca Mountain site, by even the largest nuclear tests, is comparable to ground motion from natural earthquakes of modest magnitude, of which there have been many in the vicinity of the NTS over the past several million years.

In summary, the effects of nuclear weapons testing have been extensively studied, and permanent effects are insignificant outside a limited distance. Movement on nearby faults has been induced by weapons testing, but there are good indications that testing has triggered natural processes. Ground motion at the Yucca Mountain site from past and anticipated weapons testing at distances greater than 15 km is comparable to natural seismicity, and the overall effect of weapons testing is likely to be insignificant compared to the cumulative effect of natural activity over geologic time. Natural

ANSWER 7b: (Cont'd)

faulting activity and its associated effects will be extensively studied during site characterization.

ANSWER 7c: In the vicinity of Yucca Mountain, there is virtually no perennial surface water; water must be obtained from wells. Moisture contained within the earth is called ground water. Ground water is not a rare occurrence; it occurs everywhere beneath the earth's surface. Near the surface, ground water only partly fills the cracks and pores within the rock units, but pores of deeply buried rock units are completely saturated with water. Saturated rock units that are capable of storing and transmitting groundwater are known as aquifers. Three aquifers are recognized in the Yucca Mountain vicinity: the valley fill, tuff, and lower carbonate aquifers.

Underground "rivers" occur only in cavernous limestone and in some basaltic lava tunnels. Neither of these conditions are known to occur beneath Yucca Mountain. Extensive hydrogeological testing in the Yucca Mountain vicinity has failed to disclose any indication of "a river of water" under Yucca Mountain. This phrase is often mistakenly used when what is actually meant is ground water in an aquifer. Water in the aquifers at Yucca Mountain flows very slowly and is estimated to move at a rate

ANSWER 7c: (Cont'd)

of seven meters (23 feet) per year or less. The closest known aquifer is more than 500 meters (1500 feet) below the Yucca Mountain site.

The hydrogeology of the Yucca Mountain region is discussed in the Environmental Assessment (EA) and in a large number of scientific reports and will be summarized in the Site Characterization Plan (SCP). Understanding the hydrogeology of the Yucca Mountain area is an important part of site characterization.

ANSWER 7d: This question may be interpreted with reference to three distinct periods of time: (1) the environmental baseline established prior to the initiation of field activities in the later 1970s, (2) the pre-site characterization environmental baseline, and (3) the environmental baseline established before repository construction. Each of these is discussed in turn below. It is not true that the DOE has failed to establish an environmental baseline for Yucca Mountain so that changes in the environment due to waste activities there cannot be measured. The DOE has met the substantive legal and technical requirements in all phases of field investigations, has established a suitable environmental baseline to support Nevada Nuclear Waste Storage Investigations Project-related

ANSWER 7d: (Cont'd)

activities, and will continue to do so as required by appropriate statute, regulation, and guidance.

Baseline established prior to initiation of field activities: It has been the policy of DOE to conduct preconstruction surveys for individual activities to minimize biological and archaeological impacts for field investigations both on and off the NTS. Several activities were controlled through agreement or permit stipulations and conditions. In the context of The National Environmental Policy Act (NEPA), the field investigations conducted were not a major federal action subject to NEPA. Consequently, a comprehensive baseline was not required for the investigations conducted during this time frame.

Pre-site characterization baseline: The Yucca Mountain EA establishes a pre-site characterization environmental baseline. The EA was subject to extensive public and agency review, and comments and responses addressing these comments are provided in Volume III of the EA. A review of this volume indicates that the comments submitted did not question the adequacy of the environmental baseline for assessment of site characterization environmental impacts. The Nuclear Waste Policy Act

ANSWER 7d: (Cont'd)

(NWPA) specifies that site characterization activities are considered preliminary decision-making activities, and as such do not require an Environmental Impact Statement (EIS) under NEPA or any environmental review under the subparagraph provisions of NEPA. DOE is, however, in the process of developing, in consultation with the affected States and Indian tribes, environmental monitoring and mitigation plans. These plans will provide for active monitoring of site characterization activities which may have a potential to produce adverse environmental impacts.

Baseline established prior to repository construction: As indicated in the NWPA, a recommendation by the DOE Secretary of a site for development as a repository is a major Federal action that requires an EIS under NEPA. The environmental baseline against which repository development and operation impacts will be assessed is the post-site characterization environmental conditions. This baseline will be developed pursuant to NEPA and its implementing regulations and will be reported in the EIS.

ANSWER 7d1: The potential for movement on faults is considered to be an important factor in the selection of waste

ANSWER 7d1: (Cont'd)

repository sites by both DOE and NRC. Faulting may affect surface and underground installations by the differential displacement that occurs along a fault or by the ground motion that results from the earthquake caused by such displacement. Faulting may also affect waste isolation by causing changes in parameters that affect groundwater flow or travel times. In its review of the EA, the NRC staff felt that more detail should have been included on some types of faults that have been postulated to occur in the vicinity of the site. In the time period between the preparation and review of the EA, both DOE and the NRC have become aware of the preliminary results of ongoing DOE studies that form the background for the NRC questions.

Gov. Sawyer's comments on the reactivation of faults due to nuclear weapons testing apparently result from observations on the Yucca fault in Yucca Flat, located about 50 km northeast of Yucca Mountain. Minor movements have been noted on the Yucca fault after nearby tests in Yucca Flat. However, natural movements have also occurred on the fault during the last 10,000 years so the induced displacements from nuclear tests do not appear to have reactivated a previously inactive fault.

ANSWER 7d1: (Cont'd)

A discussion of the observations on the Yucca fault will be included in the SCP. The SCP will also contain a review of preliminary analyses on the effects of ground motion generated by underground nuclear explosions (UNE). Damage to offsite mines has not been reported during UNE testing, and damage to onsite tunnels is generally confined to the immediate vicinity of the blast. Current data indicate that 95% of the aftershocks induced by a UNE are very small and occur within 14 km of the explosion site. Surface and underground facilities at the repository will be designed to accommodate ground motions from earthquakes occurring at short distances from the repository (1 to 2 km). Because of the distance from the site to current or proposed testing areas (23 km or greater), design considerations will probably be dominated by concerns about naturally occurring earthquakes and faulting rather than UNEs. Descriptions of planned activities to evaluate the effects of UNEs will also be contained in the SCP. These studies will include an evaluation of the possibility that UNEs might alter the rate of occurrence of natural earthquakes.

ANSWER 7d2: No recent hydrothermal activity has been identified at or near Yucca Mountain. Down hole temperature

ANSWER 7d2: (Cont'd)

measurements of the groundwater and heat flow measurements at Yucca Mountain and vicinity are low and thus do not indicate that there is an active hydrothermal system in the area.

The risk of developing a hydrothermal system in the area that could affect the waste package is thought to be low because hydrothermal systems take several tens of thousands of years to develop. Many additional studies are planned during site characterization that will assess the potential for hydrothermal activity and that will model the performance of the waste package under a variety of conditions.

ANSWER 7d3: Extensive studies are planned during site characterization to assess the potential for human intrusion or interference with the intended functioning of a repository. Present evidence does not indicate that Yucca Mountain is a likely target for mineral exploration, nor has any commodity been identified that is likely to be economic at present or in the future. Preliminary chemical analyses on the rocks at Yucca Mountain have failed to exhibit any significant elemental commodities, including gold and silver. No minerals formed by alteration, specifically characteristic of economic mineral

ANSWER 7d3: (Cont'd)

deposits, have been found at the Yucca Mountain site. Studies to be performed during site characterization include surface and subsurface geochemical sampling; geophysical assessments; the calculation of net value, grade, or tonnage for any commodity identified as a resource or a reserve; and a comparison of the geology and geophysics of the Yucca Mountain site with known areas of mineralization in the Great Basin in order to qualitatively assess the Yucca Mountain Site's potential for human intrusion or interference as a result of mineral exploration.

ANSWER 7d4: Geochemical effects that could provide pathways or retard the transport of radionuclides are important concerns to any proposed repository. Extensive laboratory, field, and theoretical studies have been conducted or are planned during site characterization. Experiments on individual radioactive species and their chemical interaction with rocks from Yucca Mountain will be performed under widely varying geochemical conditions. Analog field tests are also proposed during site characterization. This data will then constrain the limits of the parameters used in the modeling of the geochemical environment at the site and the pathways to the accessible environment. Extensive studies are also

ANSWER 7d4: (Cont'd)

planned on the stratigraphy, mineralogy, fracture density, etc.; and these will provide information on the geochemical environment along the pathways to the accessible environment. Therefore, it is premature to state that DOE overly relies on geochemical effects. Most of the data will be collected during site characterization. Only then can the data be used to assess the effects (negative or positive) of the interaction of the geochemical environment and radionuclides.

ANSWER 7d5: The use of models to predict the migration rates of radionuclides in the unsaturated zone is necessary and is a direct result of the extremely long travel times (in comparison to a saturated horizon) which are currently expected to exist at Yucca Mountain. An over-reliance on models of ground water travel time cannot be demonstrated because field tests and model extrapolation are yet to be done under site characterization.

Currently, over sixty scientific studies are planned during the site characterization process. While most of these studies will contribute information which will be used to understand the potential for long-term patterns of radionuclide migration, certain studies are specifically focused at

ANSWER 7d5: (Cont'd)

providing field data to predict ground water travel times in the unsaturated zone. These include:

- characterization of the vertical and lateral distribution of stratigraphic units within the site area
- characterization of percolation in the unsaturated zone
- characterization of unsaturated zone information
- geophysical and rock properties testing
- fractured-rock hydrology
- hydrochemical characterization of the unsaturated zone
- unsaturated zone system analysis and integration
- characterization of site structural features
- characterization of gaseous phase movement in the unsaturated zone.

ANSWER 7d6: The fundamental function of the waste management system is to contain and isolate the radioactive material so they cause no undue harm to man or his environment. Because this requirement extends for a very long period of time, it cannot be demonstrated by operational experience. It will be appraised by a systematic, quantitative evaluation using all relevant field and laboratory data combined with the most up-to-date analytical methodologies and expert

ANSWER 7d6: (Cont'd)

scientific judgment. It is not a valid comment to state that an over-reliance is placed on the Engineered Barrier System because much new work will be carried out during site characterization that will assess the Engineered Barrier System. The current areas of investigation of the engineered and natural components of the system include the following:

Waste Package Environment. Waste package environment activities provide experimental determinations of the physical, chemical, and hydrologic conditions the waste package may experience during its lifetime. Modeling of the experimental results provides a basis for predicting the long-term behavior of the coupled chemical and hydrologic processes that may affect the waste package.

Waste Form Testing - Spent Fuel. Work will be conducted to characterize the behavior and determine the radionuclide release rates for the spent fuel waste form under repository conditions. These efforts are required by the NRC and DOE.

ANSWER 7d6: (Cont'd)

Waste Form Testing - Glass. Glass waste form testing is conducted to determine the rate of radionuclide release from waste glass under repository conditions. Laboratory testing is used to constrain release rates and to predict long-term behavior of the waste glass material. Model development will include computer code development and laboratory work to determine important kinetic and thermodynamic data for the model.

Metal Barrier Selection and Testing. This area of activity will constrain material performance under anticipated repository conditions and under a range of possible variations in those conditions. After the material selection is made, a test plan will be developed and implemented to establish a data base for container material performance. Computer models will be used to extrapolate to the time periods involved during the life of the repository.

Other Materials. The effects of repository construction materials on the waste package environment and on the performance of the waste package components will be determined. The main construction materials that could affect long-

ANSWER 7d6: (Cont'd)

term performance of the waste package are grouts, concretes, borehole seals, shaft seals, and borehole liner materials.

Integrated Testing. This activity covers the development of thermodynamic data needed for geochemical modeling of the near-field environment and the engineered barrier system. Geochemical modeling calculations will be validated by laboratory tests.

Waste Package Performance Assessment. Waste Package Performance Assessment provides for the development of physical and mathematical models that will allow the evaluation of the waste package under different physical and chemical conditions and will be used to assess the Engineered Barrier System.

QUESTIONS FROM SENATOR JOHNSTON

QUESTION 8: Consultation and Cooperation

(a) Please clarify for the record what the difficulty is in getting the grant issue resolved with the State of Nevada.

(b) Please provide the Committee with a chronology and discussion of the consultation and cooperation activities the Department has undertaken with the States and affected Indian Tribes in the first repository program.

(c) DOE acknowledges in the draft Mission Plan amendments that consultation and cooperation with the States and Indian Tribes has been difficult. DOE also acknowledges that success of the waste program may depend largely on effective public interaction.

- What specific things is DOE doing to improve its relations with the States and Indian Tribes?
- How successful have DOE's increased efforts been?
- How will DOE judge the success of its efforts to improve relations?

(d) What does DOE believe constitutes a "good faith effort" to comply with the consultation and cooperation requirements of the Nuclear Waste Policy Act of 1982 for purposes of certification under the Fiscal Year 1987 continuing resolution?

ANSWER (a): In February 1986, the State of Nevada requested that $5.6 million be budgeted for its Calendar Year 1987 grant. The Department budgeted that amount. In October 1986, the State submitted a grant application for $10.25 million.

As a result of the substantial increase in the amount of funds requested, the Department undertook a review of the proposal and the availability of funds for the increased scope of activities. These reviews, which involved consultation between Headquarters, the Nevada Project Office, and the State extended over several weeks. The outstanding issues have been resolved and the Department made an initial award to the State of Nevada for $6.5 million for Calendar Year 1987. The State has been asked to provide some additional information on those activities not funded initially.

ANSWER (b): Section 117(c) of the NWPA requires that DOE seek to enter into written C&C Agreements with the States and Indian Tribes not later than 60 days after Presidential approval of a site for site characterization or upon written request by an affected party. DOE has taken some internal steps to prepare for these negotiations. On June 24, 1983, DOE issued internal guidelines for implementing the provisions of Section 117(c). These guidelines have recently been reevaluated by DOE, with State and Tribal input, and are currently being revised. In addition, DOE has held two workshops to prepare Project Office and Headquarters staff for negotiations. These workshops were held in September 1983 and July 1986.

Although a C&C Agreement has not yet been signed, concluding such agreements remains a high priority of DOE. The following is a brief history and current status report of C&C Agreement negotiations.

- Informal negotiations with the State of Washington began in 1979, with the first formal negotiation session being held on July 27, 1983. In the fall of 1984, a draft C&C agreement was developed with mutual concurrence on all provisions except liability and defense waste. A recent informal meeting was held October 9, 1986, to discuss the C&C negotiation process.

- DOE and the Confederated Tribes of the Umatilla Indian Reservation began negotiations in August of 1985 and six negotiations sessions have been held to date.

- On May 23, 1983, the Yakima Indian Nation requested formal negotiations, which began on July 15, 1983. Negotiations were suspended, however, pending conclusion of an agreement with the State of Washington.

- In June 1986, DOE began informal discussions on procedural arrangements with the Nez Perce Indian

Tribe. A more formal discussion was held in August 1986.

- Within 60 days of the Presidential approval of the three candidate sites--specifically, on July 25, 1986,--DOE invited the three States and three affected Indian Tribes to a joint meeting to discuss C&C Agreement issues. The affected parties subsequently responded that they preferred individual meetings.
- On November 19, 1986, DOE wrote each of the three States and three affected Indian Tribes requesting that negotiations begin or be renewed.

Section 117(c) requires that DOE prepare a report to Congress if a written C&C Agreement is not completed within 6-months after DOE seeks to enter into an agreement. Prior to submission to Congress, the report must be sent to the State or Indian Tribe for review and comment. These comments must be included in the report before it is sent to Congress. On December 23, 1986, reports were sent to the three States with candidate sites and the three Indian Tribes. DOE has received official comments from the three States, the Confederated Tribes of the Umatilla Indian Reservation, and the Nez Perce Tribe.

When the Yakima Indian Nation comments have been received, DOE will transmit the reports and the comments to Congress.

ANSWER (c): To be responsive to the needs of States and Indian Tribes, DOE is currently defining opportunities to complement the C&C process and is identifying some programmatic operating principles and initiatives to implement this process. As a continuing step in this process, DOE held a meeting with the States and Indian Tribes in New Orleans in November 1986 to obtain their assistance in efforts to define the C&C process. DOE has also recently opened all of its technical coordinating groups to States and Indian Tribal participation. DOE is developing Facility-Specific Outreach and Participation Plans. These plans will detail the institutional activities to be conducted at each site to inform and involve affected parties in the technical activities during site characterization. To prepare the plans, DOE will hold discussions with representatives of the States, Indian Tribes, and local governments to determine what types of program information they would like to receive and how they would like to participate in program activities.

ANSWER (d): DOE is currently in the process of developing objectives for the C&C process, which will be expressed as programmatic operating principles. These, in turn, will specify actions and activities that DOE will conduct, with the actions tied to program milestones whenever appropriate.

QUESTIONS FROM SENATOR JOHNSTON

QUESTION 9: Site Characterization

a. The schedule laid out in the Mission Plan amendments stretches out completion of site characterization by about 3 to 4 years.

-- When does DOE plan to begin drilling of exploratory shafts at the three sites?

-- What still remains to be done at each of the three sites prior to sinking shafts?

b. DOE has been barred by Congress from drilling at the three sites in fiscal year 1987.

-- At the time this prohibition was enacted DOE assured members of the Appropriations Committees that the prohibition would not disrupt Fiscal Year 1987 characterization activities. You now seem to be saying that the prohibition has forced you to forego drilling that you would otherwise have undertaken in FY 1987. What has changed?

c. Describe the stop-work orders issued at the first repository sites. How have stop-work orders issued to contractors affected the time schedules?

-- Were the stop-work orders a major factor in the delays?

d. How have these schedule changes affected DOE's ability to retain contractors and quality personnel at the three sites?

-- Has there been sufficient work to be done at the sites? Describe this work for each site.

e. Site characterization was originally envisioned to last 3 to 5 years and to cost under $100 million per site. DOE now says site characterization will continue for 6 to 7 years and will cost several hundred million dollars.

-- What accounts for the change between current estimates and original estimates? Please be specific.

-- How does this schedule delay affect the costs of site characterization?

ANSWER 9a: As indicated in the draft Mission Plan Amendment, construction of the exploratory shafts is scheduled to start as follows:

Tuff	Second quarter 1988
Basalt	Third quarter 1988
Salt	Fourth quarter 1989

Before proceeding to sink exploratory shafts at any candidate site, the site characterization plan for that site must be made available to the public and public hearings must be held in the vicinity of the candidate site to inform the area residents of the plan and to receive their comments. In the case of the Basalt Site, extensive geohydrologic tests are required prior to start of the drilling of the exploratory shafts into the basalt. The scope and plans for these tests are currently being discussed with the NRC, USGS, and affected States and Indian Tribes. The scope as finally established could require an alteration in the exploratory shaft construction schedule at the Basalt Site. As a result, DOE is now preparing a contingency plan to alter exploratory shaft construction sequences to maintain the Amendment schedule for in-situ testing as well as the planned date of the third quarter of 1988 for start of exploratory shaft construction. At the Salt site, site preparation, drilling of freeze holes, shaft freezing, hoist house and hoist installation, shaft collar installation, and construction of supporting facilities remain to be done prior to shaft sinking. At the Tuff site, site preparation and construction of supporting facilities remain to be done prior to shaft sinking.

ANSWER 9b: As indicated in the draft Mission Plan Amendment, the DOE had planned to start sinking exploratory shafts at the candidate sites in Nevada and Washington before the end of fiscal year 1987 and had scheduled for December 1986 the publication of the site characterization plans for these sites. In response to the budget-related delay and other factors, the DOE decided to use the additional time to implement more thoroughly the issues hierarchy and the issue-resolution process. While this approach was needed to help ensure that the site characterization plans were of the required quality, it did require revisions in the schedule for the plans. As a consequence, the start of exploratory shaft construction at the Nevada and Washington candidate sites had to be rescheduled.

ANSWER 9c: In early 1986, DOE offices at both Richland, Washington, and Las Vegas, Nevada, conducted quality performance audits of their contractors performing work related to the Yucca Mountain and Hanford sites. The purpose of the audits was to determine if the contractors technical and management controls and procedures were ready for the transition to the site characterization phase in the event that these sites were selected for characterization. A general upgrading of procedures and controls was necessary for site characterization activities to satisfy NRC requirements for establishing a licensing basis, Nuclear Waste Policy Act requirements, and DOE requirements for a major project acquisition.

DOE issued a stop work order to the principal contractor at Hanford on May 1, 1986, because technical and management controls and procedures that previously were in use, had been upgraded, or were in the process of being upgraded still did not attain the standards required for the site characterization phase. Only part of the work at Hanford was stopped. For example, work representing a large investment, that would be lost in entirety by stoppage, such as a test in progress, was continued. Safety-related activity and Site Characterization Plan preparation were continued. Immediately upon issuance of the stop work order, an intense and accelerated effort was initiated by the contractor to write procedures, install controls, and train personnel in the use of these procedures and controls. All people associated with stopped work have been involved, on a continuous basis, in the campaign to meet the conditions required for lifting of the stop work order.

Similarly, DOE issued stop work orders, from April 28, 1986, to July 7, 1986, to several of the contractors and laboratories supporting the Yucca Mountain activity. Generally, the same reasons were involved, i.e., technical and management controls were not consistent with the quality assurance provisions established for the site characterization phase. As at Hanford, only part of the work was stopped, and all people associated with stopped work were assigned immediately to development of the required procedures and controls and to intensified quality assurance training. Preparation of the Yucca Mountain Site Characterization Plan was continued.

The stop work orders are gradually being lifted on specific work at both sites when DOE becomes convinced that quality assurance requirements are satisfied. The specific work stopped generally incurs a day-for-day slippage but that does not translate to an equivalent overall program slippage. The amount of slippage in the overall schedule that is attributable solely to the stop work orders cannot be determined. Work may not proceed without proper management controls and procedures so any schedule must accommodate installing these controls and procedures.

ANSWER 9d: The major portion of the staffs at all three sites have been involved in preparation of the Site Characterization Plans and associated study plans. This is an intensive effort with personnel working long hours to complete these documents on schedule. Other major efforts involve ongoing site characterization activities for the Basalt and Tuff sites, relocation of the Salt Project Office to the candidate site area, and development of the quality assurance program for all three candidate sites. There is more than sufficient work underway at the candidate sites to saturate available manpower.

The schedule changes have not had any known effect on DOE's ability to retain contractors. No more than normal rates of attrition have been observed in the staffs at the three sites. There have been no difficulties in retaining quality personnel and in replacing people who have left with those of at least equivalent capability.

Question 9e: Site characterization was originally envisioned to last 3 to 5 years and to cost under $100 million per site. DOE now says site characterization will continue for 6 to 7 years and will cost several hundred million dollars.

-- What accounts for the change between current estimates and original estimates? Please be specific.

-- How does this schedule delay affect the costs of site characterization?

Answer 9e: Several significant items have contributed to an increase in the estimate of costs for site characterization. These items include:

- More accurate estimates of the costs for construction of exploratory shaft facilities based on the more detailed designs that have been developed. The current exploratory shaft designs are considerably different from the designs originally envisioned.

- The addition of a second exploratory shaft at each of the candidate sites, primarily for personnel safety reasons.

- The increased understanding of technical requirements that will have to be satisfied in order to support the site selection and licensing process. For example, the work needed to develop a definitive hydrologic baseline at the basalt candidate site is significantly more extensive than was originally envisioned.

- The development of more accurate schedules that provide adequate time for consultation and cooperation with States and affected Indian Tribes.

- The inclusion of additional items in reporting costs of site characterization. For example, the original estimates did not include costs for financial assistance to the States and affected Indian Tribes.

A preliminary estimate of the impact of the revised schedule described in the Draft Mission Plan Amendment on the costs of site characterization, i.e., all costs to the first repository program through completion of testing required for site selection and preparation of the draft Environmental Impact Statement, indicates that costs would increase by approximately $400 million.

QUESTIONS FROM SENATOR JOHNSTON

QUESTION 10: a. What is the estimated cost for characterization of each of the three sites selected?

b. For each of the three sites, what would be the total cost of building a repository on that site, including the cost of characterization. Please provide a breakdown showing major components of the total cost at each site.

c. How would these costs be affected if the decision were made to have only one repository and if the size and the capacity of the repository were increased to accommodate all the spent fuel projected to be produced during the life of currently licensed reactors?

d. How would these costs be affected if an MRS were not included in the system and if all packaging and handling activities were, therefore, carried out at the repository?

e. DOE's latest cost estimates indicate that the waste program could cost as much as $41 billion in 1985 dollars. Provide a schedule showing these expenditures year-by-year in year-of-expenditure dollars.

ANSWER 10a: Site Characterization Costs

OCRWM is submitting costs based on the spring 1986 Total Systems Life Cycle Cost (TSLCC) analysis. This analysis estimated the costs of the program as described in the June 1985 Mission Plan. The OCRWM program is currently re-estimating costs but the results of this effort will not be available until later this spring.

Figure 1 (taken from Volume 1 of the 1986 TSLCC report) lists the annual Development and Evaluation (D&E) costs for the Authorized System in terms of 1985 dollars. A further breakdown of these costs

Figure 1

Table 3-2

Annual D&E Costs for the Authorized System in the Reference Case
(Millions of 1985 dollars)

Fiscal Year	First Repository	Second Repository	MRS Facility	Transportation and Systems Integration	Socioeconomic Impact Mitigation	Government Administration	Total
1983	204	10	4	1	--	7	226
1984	219	18	11	2	—	34	284
1985	221	22	15	5	--	42	305
1986	386	34	3	20	—	50	493
1987	477	71	—	31	--	64	643
1988	562	65	—	30	--	64	721
1989	483	61	—	26	--	61	631
1990	398	100	—	22	—	58	578
1991	151	102	—	19	—	56	328
1992	85	114	—	18	--	25	242
1993	78	114	—	18	50	26	286
1994	73	230	—	18	50	37	408
1995	55	258	—	17	50	38	418
1996	49	266	—	14	50	38	417
1997	49	243	—	14	50	36	392
1998	16	203	—	11	50	28	308
1999	—	219	—	5	—	25	249
2000	—	120	—	5	—	25	150
2001	—	76	—	5	—	25	106
2002	—	63	—	5	—	25	93
2003	—	50	—	5	50	25	130
2004	—	35	—	5	50	25	115
2005	—	35	—	5	50	25	115
2006	—	35	—	4	50	25	114
2007	—	35	—	4	50	25	114
2008	—	23	—	4	50	25	102
2009	—	—	—	--	—	25	25
through	—	—	—	—	--	(a)	(a)
2030	—	—	—	—	--	25	25
2031	—	—	—	—	—	15	15
through	—	—	—	—	--	(b)	(b)
2089	—	—	—	—	--	15	15
Total	3,506	2,602	33	313	600	2,349[c]	9,403[c]

[a] Costs maintained at this level through the year 2030, the last year of waste emplacement.

[b] Costs maintained at this level through the year 2089, the last year of repository decommissioning.

[c] This estimate assumes that crystalline rock is the second-repository host rock.

ANSWER 10a: (Cont'd)

is given in Figure 2. Using Figure 2, OCRWM has compiled the first repository site characterization costs by candidate repository location. These costs are:

Basalt: 738 million 1985 constant dollars
Tuff: 650 million 1985 constant dollars
Salt: 806 million 1985 constant dollars

These costs represent all the first repository development and evaluation costs during the site characterization phase of the program, i.e. from Presidential approval of the candidate sites in May 1986 to the scheduled submittal of the License Application. In summarizing these costs from Figure 2, OCRWM has used one-half of the 1986 costs and excluded the costs associated with work performed on the selected site in 1990-1991. These costs are consistent with the 1987 budget submission (BO numbers) to Congress and are in 1985 dollars.

ANSWER 10b: Site Characterization and First Repository Costs

A breakdown, by major component, of the total repository costs at each site for the Authorized System is presented in the table below. Also included in this table are the projected Site Characterization Costs and other first repository

Figure 2

FIRST REPOSITORY DEVELOPMENT AND EVALUATION COSTS BY SITE
(MILLIONS OF 1985 DOLLARS)

WORK BREAKDOWN STRUCTURE/SITE	1986[*]	1987	1988	1989	1990	1991
Systems						
Basalt	7.2	8.2	8.4	8.5	8.5	5.5
Tuff	5.0	6.2	7.0	5.8	5.7	3.7
Salt	6.4	6.2	5.5	4.7	3.6	2.3
Selected Site	-	-	-	-	-	2.2[*]
Waste Package						
Basalt	19.3	19.2	18.2	18.6	12.0	-
Tuff	8.7	9.6	7.5	7.1	3.6	-
Salt	8.9	8.9	7.7	6.8	3.8	-
Selected Site	-	-	-	-	3.2[*]	8.4[*]
Site						
Basalt	29.5	37.4	37.2	28.5	24.9	8.2
Tuff	37.9	55.1	41.3	33.8	26.2	6.7
Salt	60.9	37.5	63.8	26.5	37.9	6.8
Selected Site	-	-	-	-	-	10.5[*]
Repository						
Basalt	20.5	28.7	34.9	41.8	29.9	-
Tuff	14.4	20.7	29.5	32.3	23.1	-
Salt	28.1	32.0	45.9	42.3	24.5	-
Selected Site	-	-	-	-	3.7[*]	11.0[*]
Reg/Institutional						
Basalt	12.5	12.8	14.5	17.5	18.2	5.5
Tuff	8.4	11.2	12.3	13.6	14.1	4.5
Salt	18.7	20.8	24.0	23.5	22.6	6.1
Selected Site	-	-	-	-	-	10.4[*]
Exploratory Shaft						
Basalt	17.2	38.9	58.3	35.1	44.6	2.4
Tuff	17.1	33.5	40.5	23.1	16.1	0.9
Salt	13.0	38.5	55.0	65.0	24.0	2.9
Selected Site	-	-	-	-	-	15.7[*]
Test Facilities						
Basalt	3.7	2.8	2.8	2.8	2.8	1.9
Tuff	0.9	0.7	0.5	0.4	0.4	0.3
Salt	1.1	1.3	1.2	0.6	0.6	0.4
Selected Site	-	-	-	-	-	0.4[*]
Land Acquisition						
Salt	11.1	7.2	3.5	3.4	3.5	2.3
Project Management						
Basalt	8.4	8.6	8.4	8.4	8.4	5.5
Tuff	17.2	19.6	22.5	21.5	20.8	13.8
Salt	10.4	11.4	11.5	11.5	11.6	7.7
Selected Site	-	-	-	-	-	4.5[*]
Total						
Basalt	118.3	156.6	182.7	161.2	149.3	29.0
Tuff	109.6	156.6	161.1	137.6	110.0	30.0
Salt	158.6	163.8	218.1	184.3	132.1	28.5
Selected Site	-	-		-	6.9[*]	63.1[*]
GRAND TOTAL	386.5	477.0	561.9	483.1	398.3	150.6

[*] Due to Presidential approval of candidate sites taking place in May 1986, one-half of the 1986 costs were assumed to be part of the site characterization phase.

[*] Costs for selected site are excluded from site characterization phase.

ANSWER 10b: (Cont'd)

development and evaluation costs projected to occur after the President's mid-1986 approval of the three candidate sites.

Total Repository Cost by Site for the Authorized System

(1985 dollars X 10^6)

Site	Site* Char.	Other 1st Rep D&E	1st Rep Constr.	1st Rep Oper.	1st Rep Decom.	Site Specific Total
Basalt	738	1312	2180	8890	270	13390
Tuff	650	1312	1230	4670	110	7972
Salt	806	1312	2010	5690	250	10068

* It should be noted that the total amount listed in this column will be spent regardless of which site is chosen. That is, all three sites will have to be characterized in order for one site to receive Presidential approval.

ANSWER 10c: Single Repository Costs

The following Table contains estimates for a single repository for the disposal of 87,449 MTU of commercial spent fuel (No New Orders - Constant Burnup Case) and 8000 MTU of DHLW. These costs are based on the April 1986 TSLCC analysis and were prepared in mid-1986.

Since a single repository is not part of our planning base, these estimates are not based upon

ANSWER 10c: (Cont'd)

the same level of detail as the two repository system estimates used for program planning.

The No New Orders Case includes those reactors currently licensed and those that are currently at least 40% constructed and expected to be completed.

Single Repository Costs
(millions of 1985 dollars)

Media	Site(*) Char.	Other 1st Rep D&E	1st Rep Constr.	1st Rep Oper.	1st Rep Decom.	Site Specific Total
Basalt	738	1312	2439	11972	305	16766
Tuff	650	1312	1271	6131	115	9479
Salt	806	1312	2252	7658	274	12302

* It should be noted that the total amounts listed in this column will be spent regardless of which site is chosen. That is, all three sites will have to be characterized in order for one site to receive Presidential approval.

ANSWER 10d: First Repository and MRS Costs

Following is a Table of first repository costs, with and without an MRS, taken from the Department's April 1986 TSLCC report. These costs estimates assume the EIA Mid-Case spent fuel projections and are currently being updated.

First Repository Costs with and without an MRS
(millions of 1985 dollars)

	Without an MRS				With an MRS			
Media	1st Rep Constr.	1st Rep Oper.	1st Rep Decom.	Total	1st Rep Constr.	1st Rep Oper.	1st Rep Decom.	Total
Basalt	2180	8890	270	11340	1840	8150	220	10210
Salt	2010	5690	250	7950	1600	5090	190	6880
Tuff	1230	4670	110	6010	980	4300	70	5350

ANSWER 10e: Year-by-Year Cost Schedule

The 1986 TSLCC analysis computed costs for 32 cases; sixteen for the currently Authorized System and 16 for the Improved Performance System. Ten of each set of 16 cases are reference cases while the remaining 6 were sensitivity cases. The sensitivity cases examined the potential impact of such factors as a significant change in the amount of spent fuel to be emplaced and potential delays in repository construction. The total costs for each of these 32 cases are given in the accompanying Tables 8-1 and 8-2. The case totaling 41 billion dollars represents a sensitivity case that assumes the Improved Performance system, a 10 year repository delay, and the highest cost media pair. This is the "upper bounding" case scenario examined by the Department in its 1986 TSLCC analysis. The year by year schedule of expenditures for this case is given in Table C-31. (These tables are taken from the 1986 TSLCC report which is currently being updated.)

Table 8-1

Summary of Total-System Life-Cycle Cost Estimates
for the Authorized System

(Billions of 1985 dollars)

Repository-Site Combination	D&E	Transportation	Repository			At-Reactor Storage	Grand Total*
			First	Second	Subtotal		
REFERENCE CASES (EIA MIDCASE)							
Basalt/crystalline (high)	9.4	2.1	11.3	9.5	20.8	--	32.3
Basalt/salt	9.4	2.2	11.3	7.1	18.4	—	29.9
Basalt/tuff	9.4	2.5	11.3	5.6	16.9	--	28.8
Basalt/crystalline (low)	9.4	1.8	11.3	6.5	17.8	--	29.0
Salt/crystalline (high)	9.4	1.7	7.9	9.5	17.4	--	28.5
Salt/salt	9.0	1.9	7.9	7.1	15.0	--	26.0
Salt/crystalline (low)	9.4	1.5	7.9	6.5	14.4	--	25.3
Tuff/crystalline (high)	9.4	2.0	6.0	9.5	15.5	--	26.9
Tuff/salt	9.0	2.1	6.0	7.1	13.1	--	24.3
Tuff/crystalline (low)	9.4	1.8	6.0	6.5	12.5	--	23.6
SENSITIVITY CASES							
1. EIA "No New Orders" Case							
Basalt/crystalline (high)	9.3	1.6	9.9	7.7	17.6	—	28.4
Tuff/crystalline (low)	9.3	1.4	5.3	5.3	10.6	—	21.3
2. 5-Year Repository Delay (EIA Midcase)							
Basalt/crystalline (high)	10.1	2.1	11.3	9.5	20.8	2.7	35.7
Tuff/crystalline (low)	10.1	1.8	6.0	6.5	12.5	2.7	27.0
3. 10-Year Repository Delay (EIA Midcase)							
Basalt/crystalline (high)	10.8	2.0	11.3	9.9	21.2	4.9	38.9
Tuff/crystalline (low)	10.8	1.8	6.1	6.8	12.9	4.9	30.4

*Cost categories may not add to total because of independent rounding.

Table 8-2

Summary of Total-System Life-Cycle Cost Estimates
for the Improved-Performance System

(Billions of 1985 dollars)

Repository-Site Combination	D&E	Transportation	Repository			MRS	At-Reactor Storage	Grand Total*
			First	Second	Subtotal			
REFERENCE CASES (EIA MIDCASE)								
Basalt/crystalline (high)	9.5	1.9	10.2	9.5	19.7	2.8	--	34.0
Basalt/salt	9.5	2.1	10.2	7.1	17.3	2.8	--	31.6
Basalt/tuff	9.5	2.3	10.2	5.6	15.8	2.8	--	30.4
Basalt/crystalline (low)	9.5	1.8	10.2	6.5	16.7	2.8	--	30.8
Salt/crystalline (high)	9.5	1.9	6.9	9.5	16.4	2.8	--	30.6
Salt/salt	9.2	2.0	6.9	7.1	14.0	2.8	--	27.9
Salt/crystalline (low)	9.5	1.7	6.9	6.5	13.4	2.8	--	27.4
Tuff/crystalline (high)	9.5	2.2	5.4	9.5	14.9	2.9	--	29.4
Tuff/salt	9.2	2.3	5.4	7.1	12.5	2.9	--	26.7
Tuff/crystalline (low)	9.5	2.0	5.4	6.5	11.9	2.9	—	26.2
SENSITIVITY CASES								
1. EIA "No New Orders" Cases								
Basalt/crystalline (high)	9.4	1.6	10.2	6.8	17.0	2.8	—	30.9
Tuff/crystalline (low)	9.4	1.7	5.3	4.8	10.1	2.9	—	24.2
2. 5-Year Repository Delay (EIA Midcase)								
Basalt/crystalline (high)	10.3	2.0	10.2	9.5	19.7	3.1	2.1	37.2
Tuff/crystalline (low)	10.3	2.0	5.4	6.5	11.9	3.1	2.1	29.4
3. 10-Year Repository Delay (EIA Midcase)								
Basalt/crystalline (high)	10.9	2.0	10.5	9.9	20.4	3.3	3.9	40.5
Tuff/crystalline (low)	10.9	2.1	5.5	6.8	12.3	3.3	3.9	32.6

*Cost categories may not add to total because of independent rounding.

Table C-31

Annual Total-System Costs for the Improved-Performance System with the EIA Midcase Forecast, a 10-Year Repository Delay, First Repository in Basalt and Second Repository in High-Cost Crystalline Rock
(Millions of 1985 dollars)

Year	D&E[a]	At-Reactor Storage[b]	MRS Facility[c]	First Repository[a]	Second Repository[a]	Trans-portation[a]	Total
1983	226	0	0	0	0	0	226
1984	284	0	0	0	0	0	284
1985	305	0	0	0	0	0	305
1986	478	0	0	0	0	0	478
1987	583	0	8	0	0	0	591
1988	669	0	21	0	0	0	690
1989	635	0	24	0	0	0	659
1990	516	0	22	0	0	0	538
1991	401	0	37	0	0	0	438
1992	333	0	125	0	0	0	458
1993	327	0	149	0	0	0	476
1994	214	0	149	0	0	0	363
1995	353	0	106	35	0	0	494
1996	364	0	79	60	0	0	504
1997	364	0	100	37	0	0	501
1998	332	161	126	67	0	15	703
1999	286	54	118	258	0	47	763
2000	319	0	127	309	0	33	789
2001	264	0	127	358	0	19	769
2002	238	0	63	309	0	21	632
2003	212	35	54	272	0	17	590
2004	176	35	54	228	0	16	509
2005	164	204	25	193	0	5	591
2006	158	227	21	130	38	4	578
2007	156	228	21	67	65	4	541
2008	131	228	42	98	40	39	578
2009	65	228	63	159	73	46	634
2010	116	228	63	159	278	26	871
2011	107	229	63	159	333	26	917
2012	107	229	63	159	386	26	970
2013	107	229	77	200	333	53	999
2014	105	233	80	268	293	84	1063
2015	105	234	80	268	245	58	990
2016	104	234	80	268	208	63	957
2017	104	234	80	268	140	60	886
2018	96	166	80	268	160	76	853
2019	25	47	80	268	154	83	656
2020	25	5	80	268	154	63	594
2021	25	8	80	268	154	58	593
2022	25	15	80	268	154	61	603
2023	25	20	80	268	193	87	672
2024	25	28	80	241	258	103	735
2025	25	28	80	241	258	74	706
2026	25	23	73	241	258	75	694
2027	25	7	48	241	258	59	637
2028	25	7	48	241	258	68	646
2029	25	7	48	241	258	60	638
2030	25	14	48	241	258	59	644
2031	25	31	48	241	258	89	692
2032	25	31	32	139	258	56	540
2033	25	27	4	29	258	46	388
2034	25	27	6	29	232	55	373
2035	25	26	10	29	232	29	351
2036	25	26	12	29	232	27	351
2037	25	26	8	29	232	26	345
2038	25	25	0	29	232	30	341
2039	25	25	0	29	232	37	348
2040	25	18	0	29	176	17	265
2041	15	0	0	29	27	0	71

Table C-31 (continued)

Annual Total-System Costs for the Improved-Performance System with the EIA Midcase Forecast, a 10-Year Repository Delay, First Repository in Basalt and Second Repository in High-Cost Crystalline Rock
(Millions of 1985 dollars)

Year	D&E[a]	At-Reactor Storage[b]	MRS Facility[c]	First Repository[d]	Second Repository[d]	Trans- portation[e]	Total
2042	15	0	0	29	27	0	71
2043	15	0	0	29	27	0	71
2044	15	0	0	29	27	0	71
2045	15	0	0	29	27	0	71
2046	15	0	0	29	27	0	71
2047	15	0	0	29	27	0	71
2048	15	0	0	29	27	0	71
2049	15	0	0	29	27	0	71
2050	15	0	0	29	27	0	71
2051	15	0	0	29	27	0	71
2052	15	0	0	29	27	0	71
2053	15	0	0	29	27	0	71
2054	15	0	0	29	27	0	71
2055	15	0	0	29	27	0	71
2056	15	0	0	29	27	0	71
2057	15	0	0	29	27	0	71
2058	15	0	0	52	27	0	93
2059	15	0	0	52	27	0	93
2060	15	0	0	52	27	0	93
2061	15	0	0	52	27	0	93
2062	15	0	0	52	27	0	93
2063	15	0	0	52	27	0	93
2064	15	0	0	52	27	0	93
2065	15	0	0	52	27	0	93
2066	15	0	0	52	27	0	93
2067	15	0	0	52	27	0	93
2068	15	0	0	52	53	0	120
2069	15	0	0	52	53	0	120
2070	15	0	0	52	53	0	120
2071	15	0	0	52	53	0	120
2072	15	0	0	52	53	0	120
2073	15	0	0	52	53	0	120
2074	15	0	0	52	53	0	120
2075	15	0	0	52	53	0	120
2076	15	0	0	52	53	0	120
2077	15	0	0	52	53	0	120
2078	15	0	0	52	53	0	120
2079	15	0	0	52	53	0	120
2080	15	0	0	52	53	0	120
2081	15	0	0	52	53	0	120
2082	15	0	0	52	53	0	120
2083	15	0	0	52	53	0	120
2084	15	0	0	52	53	0	120
2085	15	0	0	52	53	0	120
2086	15	0	0	52	53	0	120
2087	15	0	0	52	53	0	120
2088	15	0	0	22	53	0	90
2089	15	0	0	33	53	0	101
2090	15	0	0	55	53	0	123
2091	15	0	0	66	52	0	134
2092	15	0	0	44	53	0	112
2093	15	0	0	0	53	0	68
2094	15	0	0	0	53	0	68
2095	15	0	0	0	24	0	39
2096	15	0	0	0	35	0	50
2097	15	0	0	0	59	0	74

Table C-31 (continued)

Annual Total-System Costs for the Improved-Performance System with the EIA Midcase Forecast, a 10-Year Repository Delay, First Repository in Basalt and Second Repository in High-Cost Crystalline Rock
(Millions of 1985 dollars)

Year	D&E[a]	At-Reactor Storage[b]	MRS Facility[c]	First Repository[d]	Second Repository[d]	Trans-portation[e]	Total
2098	15	0	0	0	71	0	86
2099	15	0	0	0	47	0	62
Totals	10,939	3,887	3,276	10,493	9,938	1,998	40,531

[a] The D&E (development and evaluation) cost category covers (1) all siting, design, testing, regulatory, and institutional activities associated with the repositories, the MRS facility, at-reactor storage, and the transportation system; (2) the costs of mitigating socioeconomic impacts; and (3) the costs of program administration until both repositories are decommissioned.

[b] The at-reactor storage cost category covers the capital costs of dry storage, operation, and maintenance.

[c] The MRS cost category covers engineering (i.e., Title II and Title III design), construction, operation, and decommissioning.

[d] The repository cost category covers engineering (i.e., final procurement and construction design as well as Title III design), construction, operation, and closure and decommissioning.

[e] The transportation cost category covers the purchase of shipping casks and the operation of the transportation system.

QUESTIONS FROM SENATOR JOHNSTON

QUESTION 11: DOE's budget request submitted to Congress includes $500 million for fiscal year 1988. The budget justification provided, however, explains how the Department would spend $725 million.

--When does DOE intend to submit a budget amendment to Congress requesting the full $725 million?

--Please provide details on how DOE would allocate an appropriation of $500 million, task by task, within the program.

--In DOE's view, what would the Department be unable to do in fiscal year if only $500 million were appropriated?

ANSWER: The Department intends to submit a budget amendment in the very near future to facilitate a concurrent review of the draft Mission Plan Amendment and the resources required to carry out the FY 1988 activities in support of the program described therein.

The table below reflects a possible allocation of $500 million by task, within the Nuclear Waste Fund program. This allocation is currently under review to identify adverse impacts resulting from a $500 million FY 1988 funding level. Efforts to minimize these impacts could result in a change to this preliminary allocation.

	FY 1988 BA ($ in millions)
First Repository	$375.09
Second Repository	16.55
MRS	39.50
Transportation and Systems Integration	42.95
Program Management and Technical Support	43.91
TOTAL	$500.00

In Fiscal Year 1988, if only $500 million were appropriated, the revised program schedule, and planned accomplishments developed in support of the Mission Plan Amendment would not be achieved. Listed below, by program, are the specific accomplishments which would likely be delayed.

First Repository:

The exploratory shaft construction at the tuff and basalt sites would likely be delayed; final design of the exploratory shaft at the salt site would also likely be delayed; the intensive surface-based site characterization activities would be significantly reduced at all three sites; and the waste package and repository advanced conceptual design, and associated testing and development effects, could also be delayed. These delays would result in a slip in the schedule contained in the draft Mission Plan Amendment. Additionally, financial assistance to affected States and Indian Tribes might have to be reduced below the levels previously discussed with them, making institutional relations more difficult.

Second Repository:

The cooperative international activities in support of the Second Repository program would not be implemented as presently defined.

Monitored Retrievable Storage (MRS):

The operation of the MRS is linked to the construction authorization for the First Repository which would be further delayed by the funding reduction at the $500 million level. The MRS schedule would, therefore, slip past the first quarter of 1998 to begin acceptance of high-level waste/spent nuclear fuel, and it would no longer be possible to begin receiving fuel in 1998 through the MRS.

Transportation and Systems Integration:

Transportation activities and cask procurement would be delayed approximately one year.

QUESTIONS FROM SENATOR JOHNSTON

QUESTION 12: Payment of Licensing Fees to NRC

NRC has prepared a draft legislative proposal to amend Section 161 of the Atomic Energy Act of 1954 to permit the Commission to charge DOE user fees to recover NRC's costs in carrying out its responsibilities under the Nuclear Waste Policy Act of 1982.

-- Does DOE believe that legislation is necessary for NRC to recover these costs from DOE? Explain.

-- What is DOE's position on the NRC legislation? Please elaborate.

ANSWER: The Department of Energy does not believe that legislation is necessary to permit the Nuclear Regulatory Commission (NRC) to recover licensing costs. The Department concurs with the Department of Justice opinion expressed in the February 4, 1987, letter from John R. Bolton, Assistant Attorney General, to James C. Miller, III, Director, Office of Management and Budget. The letter states:

> "In summary, the Department believes that the Nuclear Waste Policy Act imposes an obligation on NRC to set forth a fee schedule for its necessary services in reviewing DOE's license application for the repository. The Act imposes a corresponding obligation on the Secretary of Energy to make expenditures from the Nuclear Waste Fund for all necessary costs of the repository program, including licensing."

As stated above, DOE does not believe legislation is required. Other mechanisms for accomplishing the payment of licensing fees are available. The Department of Justice letter cited above states:

"It is our understanding that several mechanisms, including a rulemaking, joint rulemaking, or memorandum of agreement have been identified for implementation of NRC's and DOE's mutual obligations regarding licensing expenses under the Nuclear Waste Policy Act. We defer to the agencies' judgment as to the best mechanism to fulfill their respective responsibilities."

QUESTIONS FROM SENATOR JOHNSTON

QUESTION 13a:	Describe the consultation and concurrence activities undertaken by the Department in Tennessee in connection with the MRS proposal. Describe the principal contentions of the State of Tennessee and DOE's responses to those contentions in the litigation over submittal of the MRS proposal to Congress.
ANSWER:	The DOE began a process of consultation and information exchange with the State of Tennessee on April 25, 1986, the date of announcement of three sites as candidates for study for an MRS proposal. Since that time DOE has participated in over 80 meetings, hearings, presentations and debates in the process of consultation and information exchange. The DOE worked closely with the State in development of the MRS proposal. This interaction has principally been through the Governor's Safe Growth Council. To support the State in review of the proposal, DOE provided a grant of $1.4 million. The State in turn provided $100,000 each to two local community groups to study the MRS proposal. The State and both local groups provided comments and/or reports to DOE on the proposal. The DOE attempted to respond to a number of those comments with changes to the final proposal.

ANSWER 13a: (Cont'd)

The United States Court of Appeals for the Sixth Circuit summarized the contentions of the State and DOE in the November 25, 1986, decision in favor of the Department in the following manner:

> This case presents for review two issues of statutory construction: (1) whether the federal courts of appeals have original jurisdiction to review the actions of the Secretary of Energy ("Secretary") regarding his compliance with the consultation and cooperation requirements of the Nuclear Waste Policy Act of 1982, 42 U.S.C. Sec. 10101 et seq. ("NWPA" or "Act") with respect to Monitored Retrievable Storage ("MRS") facilities; and (2) whether the NWPA requires the Secretary to consult with any state before he sends Congress his proposal for the location and construction of one or more MRS facilities. We hold that the federal courts of appeals have original jurisdiction over actions involving the consultation and cooperation requirements applicable to MRS facilities under the NWPA. We further hold that the NWPA does not require the Secretary to consult with any state before he sends Congress his proposal for the location and construction of one or more MRS facilities. ... (Opinion of Sixth Circuit, 11/25/86)

The Department believes it has, therefore, gone well beyond the requirements of the Act in its interactions with Tennessee prior to planned submittal of the proposal.

On March 30, 1987, the U.S. Supreme Court denied Tennessee's petition for certiorari, which freed the Department to submit the proposal in accordance with the favorable circuit court ruling. The proposal was submitted on March 31, 1987.

QUESTIONS FROM SENATOR JOHNSTON

QUESTION 13b: Has DOE revised its monitored retrievable storage proposal since the December 1985 draft to reflect the years delay in its submission to Congress or to reflect the increased emphasis given to the MRS in light of the 5 year delay in repository operation?

--If so, how?

--If not, why not?

ANSWER: The Department has updated the proposal that was available for submission to Congress in February 1986. The February 1986 version was withheld from submittal by the Department due to continuing litigation. The Department has reviewed its analysis of the need for MRS and believes that previous arguments presented and conclusions reached are still valid in light of the programmatic changes that have occurred over the past year.

QUESTIONS FROM SENATOR JOHNSTON

QUESTION 13c: In the December 1985 draft MRS proposal, weren't the benefits of an MRS calculated in terms of a two repository system? How does the postponement of the second repository weaken or strengthen the arguments?

--Would it be appropriate to reevaluate the MRS proposal to reflect these changes since December 1985?

--Would it be appropriate to include additional discussion in the MRS proposal of the need to work out appropriate concessions and incentives that would be available to the host State?

ANSWER: The analysis of the need for MRS, that was provided in the December 1985 Review Copy and in the final proposal submitted to Congress, did not assume any relationship between the MRS and the second repository. All the presented benefits of MRS were based on the MRS servicing only the first repository. As a result, the Department does not believe that any changes to the proposal are necessary in this area. Regarding the question as to whether the Department should include additional discussion in the proposal addressing the need to work out appropriate concessions and incentives that would be available to the host State, the Department has outlined in detail in the proposal how it proposes to consult and cooperate with the MRS host State to accommodate State and local concerns. The Congress certainly has the prerogative to add to the

ANSWER 13c: (Cont'd)

Department's proposal in this regard. More detailed presentations in this area, consistent with any limitations or guidance provided by Congress, can also be reserved for the formal consultation and cooperation discussions that will occur between the host State and the Department, should the MRS be approved by the Congress. Subsequently, formal revisions to this area of the written proposal are not being actively considered by the Department at this time.

QUESTIONS FROM SENATOR JOHNSTON

QUESTION 13d:	How could the arguments for an MRS be strengthened in light of DOE's experience of the last year?
ANSWER:	In view of delays in the first repository, the position of the MRS in the waste management system became critical to the Department's ability to accept spent fuel from utilities in 1998. As a result, besides affording the system the many programmatic and institutional benefits that have been previously analyzed, the need for MRS now is strengthened. Having an MRS as an integral, and early, part of the system can also contribute to regional equity and timing considerations for the second repository.

QUESTIONS FROM SENATOR JOHNSTON

QUESTION 13e: The schedule included in the June 1985 Mission Plan assumed Congressional authorization of the MRS proposal by the fall of 1986, submittal of a license application to NRC by early 1989, and issuance of a license by NRC by 1991.

--How has the MRS schedule been adjusted to account for delays thus far?

ANSWER: Assuming that the Congress authorizes the MRS during FY 87, and adjustments are made in the overall project schedule, the Department projects that a license application could be submitted to NRC by early 1990. NRC could then issue a license for the MRS during 1992 or 1993. Construction on the facility would then begin and extend over a four year period ending in 1996 or 1997. Under these circumstances, the MRS could then begin to operate and accept spent nuclear fuel by the time the repository is projected to receive a construction authorization in the first quarter of 1998.

QUESTIONS FROM SENATOR JOHNSTON

QUESTION 13f: What will DOE do if the MRS is not approved or if it is not ready in time to meet the January 31, 1998 commitment to take spent fuel from the utilities?

ANSWER: If the MRS is not approved or if it is not ready by January 31, 1998 to take spent fuel from the utilities, the utilities would continue to be responsible for storing the spent fuel at the reactor sites until the authorized federal waste management system was available to take the spent fuel. The DOE will continue to conduct those authorized activities that will lead to a capability to safely and permanently dispose of the spent fuel as soon as possible.

QUESTIONS FROM SENATOR JOHNSTON

QUESTION 15: a: A question was asked at the February 5 hearing whether NRC had ever approved a transport cask design submitted by DOE. Please clarify for the record the status of any license applications submitted to NRC by DOE. In each case, please include:

-- when the license application (or topical safety analysis report, as appropriate) was submitted to NRC;

-- what the major issues are still to be resolved;

-- how long DOE anticipates licensing will take;

-- whether the cask has been previously approved through DOE's "certificate of compliance" process; and

-- how long did it take for completion of DOE's review to issue a certificate of compliance.

b. What are DOE's estimates of the cost of transport cask licensing by NRC?

-- Please include total program cost estimates as well as a per cask estimate, based on licensing fees, etc.

-- Do the per cask estimates vary according to cask size and capacity?

c. Does DOE plan to underwrite the cost of NRC licensing of transport casks under its transportation business plan? Explain.

ANSWER 15a: Although DOE may certify its own packages, there are a variety of DOE packages having NRC certificates. There are at least three spent fuel casks now in service with both DOE and NRC certificates. Charles MacDonald, Chief of the NRC Transportation Certification Branch, was interviewed about this question on 2-23-87. The following is a summary of that interview,

ANSWER 15a: (Cont'd)

supplemented with additional information where appropriate.

DOE has the following designs under the review process at the present time. These designs are: the TN-BRP and the TN-REG, both casks that would be used in support of West Valley shipments; the ORNL/HFIR cask; and the MH1A cask. Two applications by ORNL that had been submitted earlier were withdrawn by ORNL in Jan. 1987 (the ORNL/LOOP cask and the ORNL/GARDEN cask). There are three Division of Naval Reactors applications that are presently under review by NRC (the M-130, A1W3, and the DIG casks).

The certificate application process can be protracted. Some of DOE applications cited above have requests for information that date to the May 1985 time period. These requests for information are submitted by the NRC to the applicant; the applicant varies with the different DOE-owned casks, and is noted for each cask on Table 1. For example, requests for information by the NRC were made for the TN-BRP cask on 2-12-86 and similarly a request was made by NRC for information on the TN-REG cask on 10-22-85 (the TN-BRP and the TN-REG casks are similar in design). The NRC's concerns

ANSWER 15a: (Cont'd)

were with the designs of the basket and impact limiters; Sandia is currently in the process of analyzing these designs. A request for information on the ORNL/HFIR cask was requested by NRC on 10-3-85. Because of unresolved questions concerning structural aspects, and the uncertainty that the expenditure of significant funds would enable resolution of those questions, the DOE has decided to procure a new ORNL/HFIR cask in lieu of the earlier one. The new cask should be fabricated by the end of 1987. Finally, a request for information on the MH1A cask was requested on 5-31-85. General concerns were voiced about the structural integrity of the cask in an accident environment to maintain containment and in a normal environment because the load limiters were too stiff. The DOE continues in its attempt to address these concerns. In each of these requests for additional information, the dates are as given above, but in each case, there has been no response to the NRC by the applicant. It should be noted that the casks mentioned above are considered by the NRC to be the "DOE casks" that are still in the certificate application process. The applications for these casks have not been denied.

ANSWER 15a: (Cont'd)

Table 1 summarizes all of the DOE owned, currently certified (by either NRC or DOE) spent fuel packagings that are used to support DOE spent fuel transport operations.

ANSWER 15b: NRC has established a fee structure where the commercial applicant for a cask certificate of compliance is charged by the number of hours taken to review the design submitted. At the present time there is a cap of $170,000 that may be charged for each cask application being evaluated. Typically, NRC charges are expected to be less than the maximum amount.

Under present NRC policy, an application for a certificate of compliance that is filed by a government agency is fee exempt. However, a letter from DOJ to OMB (John R. Bolton, Assistant Attorney General to James C. Miller, III, Director) stated that DOJ believes the NWPA imposes an obligation on NRC to set forth a fee schedule for its necessary services and a corresponding obligation on DOE to make expenditures from the NWF for licensing costs. DOE plans to reimburse NRC for its licensing costs.

ANSWER 15c: As explained in 15b above.

TABLE 1

	1	2	3	4	5	6	7
1	SPENT FUEL CASKS FOR DOE PROGRAMS *						
2							
3							
4	CERT. NO.	CASK	CASK OWNER	CERTIFICATE	NRC	CERTIFICATE	COMMENTS
5		DESCRIPTION		APPLICANT	CERTIFICATE	EXPIRATION	
6					YES/NO	DATE	
7	USA/5507/B( )	HFIR CASK	DOE	DOE-OR	NO	4/30/89	
8	USA/5607/B( )F	MODEL T-2	DOE	DUPONT-SAL	YES	3/31/87	See Note 1
9	USA/5787/BLF	MODEL D-38	DOE	ORNL	YES	7/31/87	
10	USA/6345/BF		DOE	DOE-CH	NO	8/9/88	
11	USA/6495/B( )F		DOE	DOE-SAN	NO	3/31/87	
12	MH 1A		DOE	DOE			See Note 2
13	USA/9132/B(M)F	MODEL T-3	DOE	NUCLEAR PKG INC	YES	3/31/91	
14	USA/9200/B(M)F	MODEL 125-B	DOE-IDAHO-OPNS	NUCLEAR PKG INC	YES	4/30/91	
15	WEST VALLEY CASK		DOE	DOE			See Note 2
16							
17	* Information Source, RAMPAC data base						
18	Note 1: The RAMPAC data base also lists a DOE certificate with an expiration date of 09/15/90.						
19	Note 2: Certifation process continues.						
20							

QUESTIONS FROM SENATOR JOHNSTON

QUESTION 15d: DOE plans to use Transnuclear Inc.'s TN-BRP cask (owned by Nuclear Fuel Services) to transport fuel from the West Valley Demonstration Project to the Idaho National Engineering Laboratory under a cooperative demonstration project.

How have delays in NRC's licensing of the TN-BRP effected the schedule for removal of fuel from West Valley, the overall cleanup schedule for West Valley, or the Idaho dry storage demonstration program?

ANSWER: Nuclear Fuel Services fulfilled its cost shared contractual agreement with the DOE when it delivered two casks to West Valley, New York. These casks, the TN BRP and the TN REG, are now owned by the DOE and are at West Valley awaiting NRC certifications before shipment of fuel to the Idaho National Engineering Laboratory. The delays in certification have had no impact on either the West Valley Project or the Idaho dry storage demonstration program. The Idaho Operations Office manages all three of these projects and a continual schedule evaluation is carried out at the Idaho Operations Office to assure that windows of availability and non-interference between project activities are defined. The present estimates for non-interference with West Valley Operations are: Loading of casks prior to September 1987 or after WVP size reduction activities but before 1991. There is no impact on dry storage demonstration projects.

QUESTIONS FROM SENATOR JOHNSTON

QUESTION 16: Please provide an update on the status of DOE's cooperative programs with utilities to demonstrate dry storage, rod consolidation, and transportation.

ANSWER: DOE has three Cooperative Agreement (Sec. 218 NWPA) programs with utilities. Two are for NRC licensed dry storage demonstrations and one for an NRC licensed in-pool consolidation demonstration, all at the utility reactor sites. In addition, DOE has supported some cost shared, in kind, projects for unlicensed in-pool rod consolidation. The three (Sec. 218 NWPA) Cooperative Agreement Demonstrations are with: Virginia Power (Independent Spent Fuel Storage Facility using metallic dry storage casks at the Surry site); Carolina Power and Light (Independent Spent Fuel Storage Facility using horizontal concrete silos for dry storage at the J. B. Robinson Site; and Northeast Utilities Service Corporation (In-pool rod consolidation demonstration at the Millstone II site).

Virginia Power obtained a license from the NRC in July of 1986 for its Independent Spent Fuel Storage Facility and it is now operational with three GNS-Castor V/21 casks storing 21 assemblies each.

Carolina Power and Light received its Independent Spent Fuel Storage Installation License in August

ANSWER 16: (Cont'd)

of 1986. The utility is now in the process of applying for amendments to the license for minor material changes to the technical specification. Modules have been constructed and operations are expected to begin as soon as the license amendment and storage canister topical report amendments are approved by the NRC. This is estimated to be toward the end of the FY87.

The Northeast Utilities Service Corporation completed its cold consolidation demonstration at the Combustion Engineering Facility in Windsor Locks, Connecticut in December 1986 and is now in the process of installing the equipment in the Millstone II pool. It expects the amendment to its Millstone II Operating License for the storage of consolidated fuel in the Millstone II pool by April, 1987.

Two cost shared unlicensed demonstrations with Rochester Gas and Electric (RG&E) were also completed this past year. At the West Valley Pool, six Ginna reactor assemblies were consolidated using NAC corporation equipment and eventually achieved a 1.8:1 consolidation. At the Battelle Columbus Laboratory Pool, five Ginna assemblies were consolidated utilizing U.S. Tool and Die

ANSWER 16: (Cont'd)

equipment. A consolidation ratio very close to 2:1 was achieved. In each case the consolidated fuel was returned to the RG&E Ginna facility.

An early DOE-TVA Interagency Agreement to consolidate twelve boiling water reactor (BWR) assemblies at the Browns Ferry Facility has been indefinitely postponed pending resumption of and non-interference with operations at the Browns Ferry Plant.

There are no NWPA cooperative programs with utilities to demonstrate the transportation of fuel. Fuel for the unlicensed demonstration of dry storage at the Idaho National Engineering Laboratory was shipped in NRC certified shipping casks from the Virginia Power Surry plant to Idaho as part of the DOE/Virginia Power Cooperative Agreement.

QUESTIONS FROM SENATOR JOHNSTON

QUESTION 17a: DOE anticipates consolidating fuel rods on a large scale basis at an MRS prior to shipment of fuel to a final repository.

--Isn't it true that some preliminary studies have shown that rod consolidation on a large-scale basis may not necessarily be advantageous from a cost standpoint because of the additional costs of mining needed to provide sufficient spacing to dissipate heat load?

--What are the bases for DOE's belief that large scale rod consolidation at a centralized facility would be advantageous from a cost standpoint?

ANSWER: DOE has performed some preliminary studies on the impacts of intact (i.e. several square assemblies) versus consolidated spent fuel (compacted rods) in cylindrial packages as the reference design. These studies have supported the use of consolidated fuel as part of the reference package but have also indicated that more detailed studies were needed to effectively evaluate this issue. Such studies are currently underway and are expected to be completed early this summer. Indications are that the primary cost drivers are the surface facilities and waste package costs which tend to offset one another; mining costs depend on the number of packages to be emplaced and the associated heat load. However, these costs are site-specific and, at this point, have a fairly high degree of uncertainty. In addition, there are factors

ANSWER 17a: (Cont'd)

other than cost, such as long-term package performance in a site-specific environment, which will affect final decisions on whether to retain consolidated fuel in the reference package design. More detailed studies address these site-specific factors.

The basis for including the capability for large-scale consolidation of spent fuel rods at a centralized facility has been that consolidated fuel is part of the current reference waste package design. Thus, these capabilities would have to exist at either an MRS or a repository. If consolidation remains the reference case, DOE believes it is best done on a large scale at facilities designed, built and operated specifically for the waste packaging process.

QUESTIONS FROM SENATOR JOHNSTON

QUESTION 17b: When will DOE demonstrate that rod consolidation can be done as a large-scale operation on an economical basis?

--What is the status of DOE's prototype dry rod consolidation project underway at Idaho National Engineering Laboratory?

--What is the estimated cost of the Idaho consolidation project?

ANSWER: DOE will demonstrate rod consolidation as a large-scale operation at INEL during a hot demonstration in late 1989. The results of consolidating a total of approximately 200 spent fuel assemblies from three different manufacturers will provide a basis for evaluating the economy of fuel consolidation.

Phase I of the multiphase competitive procurement has been completed. Five contractors submitted their preliminary designs and proposals for moving into the Phase II (Final Design) stage. These are now in the evaluation process. A maximum of three Phase II contracts are scheduled for award in April 1987.

Estimated cost of the Idaho consolidation project, including a hot demonstration of rod consolidation for approximately 200 spent fuel assemblies, a hot demonstration of volume reduction equipment for non-fuel bearing components, and a cold demonstration of consolidated fuel canister

ANSWER 17b: (Cont'd)

welded closure equipment is in the range of 60-70 million dollars. This includes the transportation of fuel for the consolidation process and the costs of dry storage until ready for shipment to a repository for final emplacement.

QUESTIONS FROM SENATOR JOHNSTON

Question 18: a. Please describe the generic work being done by DOE related to crystalline rock.

b. Please specify what programs were initiated or expanded after DOE's May 28 decision to postpone site-specific work related to a second repository.

c. Describe the relevance of work DOE is doing in Canada at the Underground Research Laboratory to the repository program in the United States.

-- How much money is DOE contributing to each of these programs?

-- How would these programs be affected if Congress told DOE to start-up site specific work on the second repository?

ANSWER 18a: As announced by the Secretary on May 28, 1986, the areas identified as suitable in the Draft Area Recommendation Report for the Crystalline Repository Program are no longer under active consideration. The DOE is conducting non-site specific studies of crystalline rocks to better understand its geologic characteristics and its capability as a potential host for a repository. These studies are directed at determining (1) whether a particular type of host rock, regardless of its geographic location, meets various geologic, hydrologic, geochemical, and rock-mechanics criteria, such as those specified in the siting guidelines; (2) how the host rock would respond to the heat and radiation emitted by the waste; and (3) how well the engineered components of the repository (e.g., the waste package, which

ANSWER 18a: (Cont'd)

consists of the waste form, a metal disposal container, and any packing material around the container) would perform under the conditions provided by the host rock. These generic studies will utilize existing literature, development of computer codes/models, and data collected from studies performed for crystalline in other countries (e.g., Canada, Sweden, and Switzerland).

ANSWER 18b: The Secretary's decision resulted in the initiation of a Repository Technology Program that would focus on the following:

- Non-site specific evaluations of potential host rocks (including, but not limited to, crystalline rock).
- Development of analytical approaches to evaluate non-site-specific geologic settings in terms of waste isolation performance capability.

The work will require the development of an analytical approach for the selection of geologic settings. This approach will identify the characteristics that a particular type of host rock must have in order to satisfy regulatory requirements for waste isolation given the design of the repository and the waste package. Because it will integrate geologic characteristics,

ANSWER 18b: (Cont'd)

engineered components, and regulatory requirements--and because it will be based on the experience gained from performance assessments for the first repository--this type of analysis is expected to be associated with a high level of confidence. Thus, whereas the screening process for the first repository progressed from national surveys through regional studies (thousands of square miles), area studies (hundreds to thousands of square miles), location studies (tens to hundreds of square miles), and site studies, a possible strategy for the second repository could allow fewer areas of smaller size to be selected early in the process.

Included in the work will be the development of mathematical models and computer programs for analyzing the potential waste-isolation performance of a repository in a particular host rock. This effort will be greatly facilitated by the experience gained from the first-repository program, including interactions with the Nuclear Regulatory Commission; nonetheless, the performance-assessment models will need to be tailored to the characteristics of each rock type.

ANSWER 18c: Activities and the results from the USDOE/AECL (Atomic Energy of Canada, Ltd.) cooperative agreement will provide the Repository Technology Program with geologic and engineering data gained from the field. This data is then used to further the development of performance models in an effort to enhance DOE's capability to predict geologic performance. Specific data from this agreement is gained from drilling boreholes, conducting various underground experiments, exchanging performance assessment codes, and the extension of the URL experimental shaft from its current depth of 240M to 440M. The extension of the URL shaft will allow the U.S. to participate in construction through a major fracture in crystalline rock as well as physically gaining the knowledge of how crystalline rock reacts at repository depth.

The work done under the USDOE/AECL agreement is organized under four tasks. The DOE spends money towards accomplishing these tasks in two ways: first, through direct contributions to AECL and, second, through payments to U.S. contractors who are assisting the DOE in carrying out the work under the agreement. The table below indicates the tasks and the direct contribution dollars budgeted for each for the term of the agreement.

U.S. Dollars
(in thousands)

Task	FY86	FY87	FY88	FY89	Total
1. Cooperative Experimental Program at the URL	0	0	536	536	1,099
2. Performance Assessment Studies	0	157	0	0	157
3. Field Testing Investigations	944	1,277	0	0	2,221
4. Shaft Extensions and Characterization	1,001	4,740	4,617	2,151	12,509
Total	1,948	6,174	5,153	2,687	15,962

Following the Secretary's decision, the statement of work for the USDOE/AECL agreement was reviewed, negotiated, and modified to reflect the termination of the siting program for the second repository. It was determined that a majority of the work under the agreement will provide data that remains beneficial to the continuing generic studies of crystalline rock. Should site-specific activities for a second repository be started again, a similar activity would be conducted and a modification of the agreement would be negotiated with the Canadians as appropriate. However, it is not expected that any significant change would result.

QUESTIONS FROM SENATOR JOHNSTON

QUESTION 19: "Waste Summit"

a. Washington Governor Booth Gardner has suggested that a national conflict resolution process is needed to put the waste program back on track and restore credibility to the program.

- Would DOE be willing to participate in some type of "waste summit" as envisioned by Gardner and others?
- Does DOE believe that some action is needed to restore credibility to the program? What are your ideas?

ANSWER: The Department believes that the appropriate forum for national consideration of the nuclear waste program is the Congress and, consequently, has made available to the Congress its views in the draft Mission Plan Amendment.

The Department was disappointed that Governor Gardner has up to now rejected the invitation to enter into a Consultation and Cooperation Agreement as provided by the Nuclear Waste Policy Act. This was, of course, the process established by the Congress to reach agreement on these NWPA program issues.

As the draft Mission Plan Amendment states, the success of the waste-management program may largely depend on the success of institutional relations as well as interactions with the public. The Department, therefore, plans to increase its efforts to improve productive institutional relations and to negotiate formal C&C agreements. Examples of recent efforts include the opening of all coordinating group meetings to State and Tribal participation, opening regular quarterly meetings with the States and Tribes to the public and press, and inviting State and Tribal representatives to participate in a training program for Quality Assurance Auditors. This training should help the States and Tribes perform their important tasks of independent evaluation of the technical quality of the Waste Management Program.

QUESTIONS FROM SENATOR JOHNSTON

Waste Confidence

QUESTION 20: a. RC's Waste Confidence Decision, issued in August 1984, found reasonable assurance that one or more geologic repositories would be available by the years 2007 to 2009.

Does the 5 year delay envisioned by DOE for operation of a repository cause concern about the basis for the waste confidence decision?

b(1): According to DOE, the five year delay is largely attributable to additional time needed to meet near-term milestones during the site characterization and site selection process. Except for 9 months added to the NRC licensing process and 7 months added for construction time, DOE has not made adjustments to the longer-term milestones.

Is it likely that additional delays will be encountered to defer repository operation beyond encountered to defer repository operation beyond 2003?

b(2): If there are such delays, at what point would the bases underlying the waste confidence decision need to be reevaluated?

ANSWER 20a: No. It should not cause such concern.

The court decision which, in part, initiated the Waste Confidence Rulemaking (State of Minnesota v. NRC. 602 F2d 412 (1979)) requested only that NRC determine the degree of assurance that off-site storage would be available by the years 2007 - 2009 for spent fuel stored at reactor sites, and if not, whether the fuel can be stored safely at the sites beyond those dates. The Commission chose to broaden the scope of the proceeding beyond that required by the Court to reassess its

ANSWER 20a: (Cont'd)

basis for reasonable assurance that methods of safe permanent disposal of high-level waste would be available when they are needed.

The Commission findings included the following:

- That, if necessary, spent fuel generated in any reactor can be stored safely and without significant environmental impact for at least 30 years beyond the expiration of that reactor's operating licenses at that reactor's spent fuel storage basin, *or* at either onsite or offsite independent spent fuel storage installations.
- That safe independent onsite or offsite spent fuel storage will be made available if such storage capacity is needed.
- That sufficient repository capacity will be available within 30 years beyond expiration of any reactor license to dispose of waste originating in such reactor up to that time.
- That a repository will be available by the years 2007 - 2009.

Thus, there were substantial bases, other than repository availability in 2007 - 2009, for the

ANSWER 20a: (Cont'd)

Commission's confidence that high-level radioactive waste and spent fuel will be managed in a safe manner until sufficient repository capacity is available to assure their safe disposal. Furthermore, the Commission's finding that a repository will be available by 2007 - 2009 was not based on the simple assumption that NWPA dates would necessarily be met. The Commission thoroughly examined the technical, institutional, funding, and scheduling aspects of implementing a repository as well as the provision of the NWPA. The Commission noted past DOE schedule delays, and acknowledged the possibility of some future slippage, in setting forth its basis for assurance that a repository would be available 2007 - 2009.

ANSWER 20b(1): As indicated in the draft Mission Plan Amendment, the revised schedule is success oriented but achievable. Achievement of the schedule will require the Department's best efforts and will depend on the availability of adequate resources, both manpower and budgetary. However, we believe that the schedule does allow adequate time for each of the program phases remaining before repository operation, i.e., site characterization, site selection and approval, NRC licensing review, and construction of the repository.

ANSWER 20b(2): A determination of need to reevaluate the bases underlying the waste confidence decision is the perogative solely of the Commission. Some of the decision bases relevant to this determination are discussed in response to question 20a above. Considering that the initiating court decision required assurance only that offsite storage, not a repository, be available by 2007 - 2009, it is not apparent that a delay of repository availability past 2007 - 2009 would automatically necessitate a reevaluation. If the Commission felt that a schedule delay was of a magnitude to call into question the likelihood of a repository being available within the time period for which waste can be safely stored, they would most likely want to reevaluate the bases for the decision. The Commission stated in its decision that it would review its conclusions on waste confidence if significant and pertinent unexpected events occur, or at least every 5 years until a repository is available. On this basis, a reevaluation would be started in 1989 in any event.

QUESTIONS FROM SENATOR JOHNSTON

QUESTION 21: DOE includes 36 months in its schedule for NRC review of a repository licensing application. However, NRC warned DOE in a November 1985 letter that its review could take as much as 39 to 65 months.

Why hasn't DOE planned for a longer period for NRC licensing? Is DOE confident that there will be sufficient interaction between NRC and DOE prior to submittal of a license application to assure that licensing can be completed in 36 months.

ANSWER: The 36-month licensing review period is specified in the NWPA of 1982. This time interval was specified by Congress following extensive NRC testimony before Congress and NRC discussions with Congressional staff concerning licensing schedules. Current levels of prelicensing interaction between DOE and NRC are well in excess of those required at the time the NWPA was drafted. For example, since then, in June 1983, DOE and NRC signed a "Procedural Agreement" which provides for the exchange of information during site investigation and site characterization. Also now planned is a "Licensing Support System" - a computerized system for storage and dissemination of information - which is intended to eliminate the lengthy discovery periods allowed for in the 36 month schedule. No such system was considered at the time the NWPA schedule was specified. The technology for such a system was not even available then. DOE believes that with these unique and unprecedented prelicensing interactions, the licensing process should be completed in less than the 36 months originally scheduled. Thus the Mission Plan allocated a 27 month period for licensing. The schedule proposed in the Draft Mission Plan Amendment provides an additional 9 months and thus corresponds to the NWPA schedule of 36 months. DOE believes this provides a substantial margin over the optimum schedule which should be achieved, however, given the historic uncertainties in the NRC licensing process, there is no way to assure that the licensing process can be completed in any given time period.

QUESTION 22: Decay of Fission Products

a. How long does it take for spent fuel and glassified high-level defense waste to decay to the point that its radioactivity, heat production and toxicity are comparable to natural uranium?

b. Provide the Committee with decay curves for radioactivity, heat production and toxicity for spent fuel and glassified high-level defense waste.

ANSWER: Decay curves of thermal power, radioactivity, and toxicity of spent fuel (SF) and defense high-level waste (DHLW), along with values for the natural uranium ore from which the SF and DHLW were produced, are attached to this response. The curves are based on calculations performed with the ORIGEN2 computer code and on assumptions documented in the references. Comparisons of the thermal power of SF and DHLW with natural uranium have not traditionally been made, and so are not shown.

To summarize the decay curves, the times at which the SF and DHLW become equivalent to the parent natural uranium ore are as follows:

	Crossover time (years)	
	SF	DHLW
Radioactivity	300,000	10,000
Thermal Power	N/A	N/A
Ingestion Toxicity (ICRP-30)	1,500,000	2,000
Ingestion Toxicity (10 CFR 20)	2,500	300

The DHLW crossover times are consistently much less than those for SF. This results from the much lower average actinide production per unit amount of U-235 fed into the system.

The toxicity curves require some explanation. Comparisons of SF and DHLW with each other and with uranium ore in terms of a simple toxicity index should be used with great caution. A toxicity index such as water dilution volume is only a crude measure of the potential hazard to humans. It will greatly overestimate the actual hazard posed by the waste, which must take into account how likely it is that the waste will be released into the biosphere and eventually be ingested by humans.

In addition, there are substantial uncertainties in the estimates of the risk of cancer per curie of any radioisotope ingested into the body, resulting from uncertainties about: 1) the fate of the radioisotope in the body (what fraction is taken into the system, where it goes, and how long it stays there), and 2) how much damage is done by the radiation.

As new data and extrapolation methods become available, estimates of the toxicity of various isotopes change over time. The impact of such changes can be seen in the two sets of toxicity curves, which present toxicities based on older Nuclear Regulatory Commission (NRC) standards for protection of the general public (10 CFR Part 20) and recently revised estimates published by the International Commission on Radiation Protection (ICRP).

The dramatic increase in toxicity seen by using the ICRP-30 dosimetry is attributable in large measure to changes in metabolic data for a single radionuclide, neptunium-237. The ingestion toxicity of Np-237 was increased in ICRP-30 by a factor of about 230 over earlier assessments (ICRP-2), based on the results of a few animal studies. Additional, more realistic data obtained since then suggest that such a large increase in toxicity was inappropriate. The most recent data, to be published in separate reports by the Nuclear Energy Agency and the National Council on Radiation Protection, show an ingestion toxicity for Np-237 that is about a factor of 10 lower than ICRP-30 dosimetry values.

Finally, we note that 10 CFR Part 20, which is the governing regulation for the repository program in the preclosure phase and is based on ICRP-2, has not been changed using the ICRP-30 values. It is uncertain whether 10 CFR Part 20 will be changed, especially in view of the most recent information.

References

1. A.G. Croff, "ORIGEN2: A Versatile Computer Code for Calculating the Nuclide Compositions and Characteristics of Nuclear Materials," Nucl. Tech., 62, 335-352 (September 1983).

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3. R.G. Baxter, Basic Data Report, Defense Waste Processing Facility, Savannah River Plant, DPSP 80-1033 (April 1985).

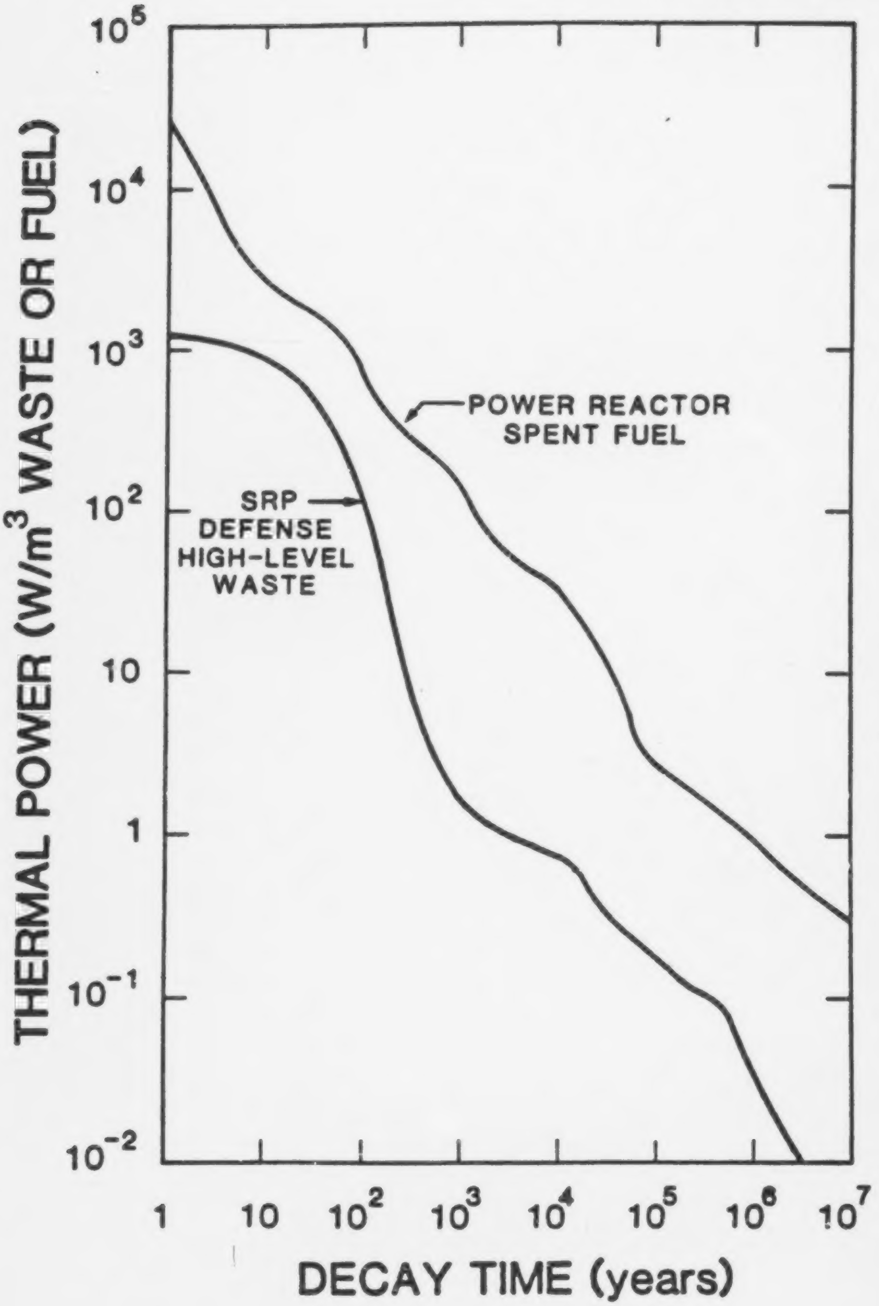
4. Defense High-Level Waste Technology Program Office, Perspective on Methods to Calculate a Fee for Disposal of Defense High-Level Waste in Combined (Civilian/Defense) Repositories, DOE/RL-86-10 (December 1986).

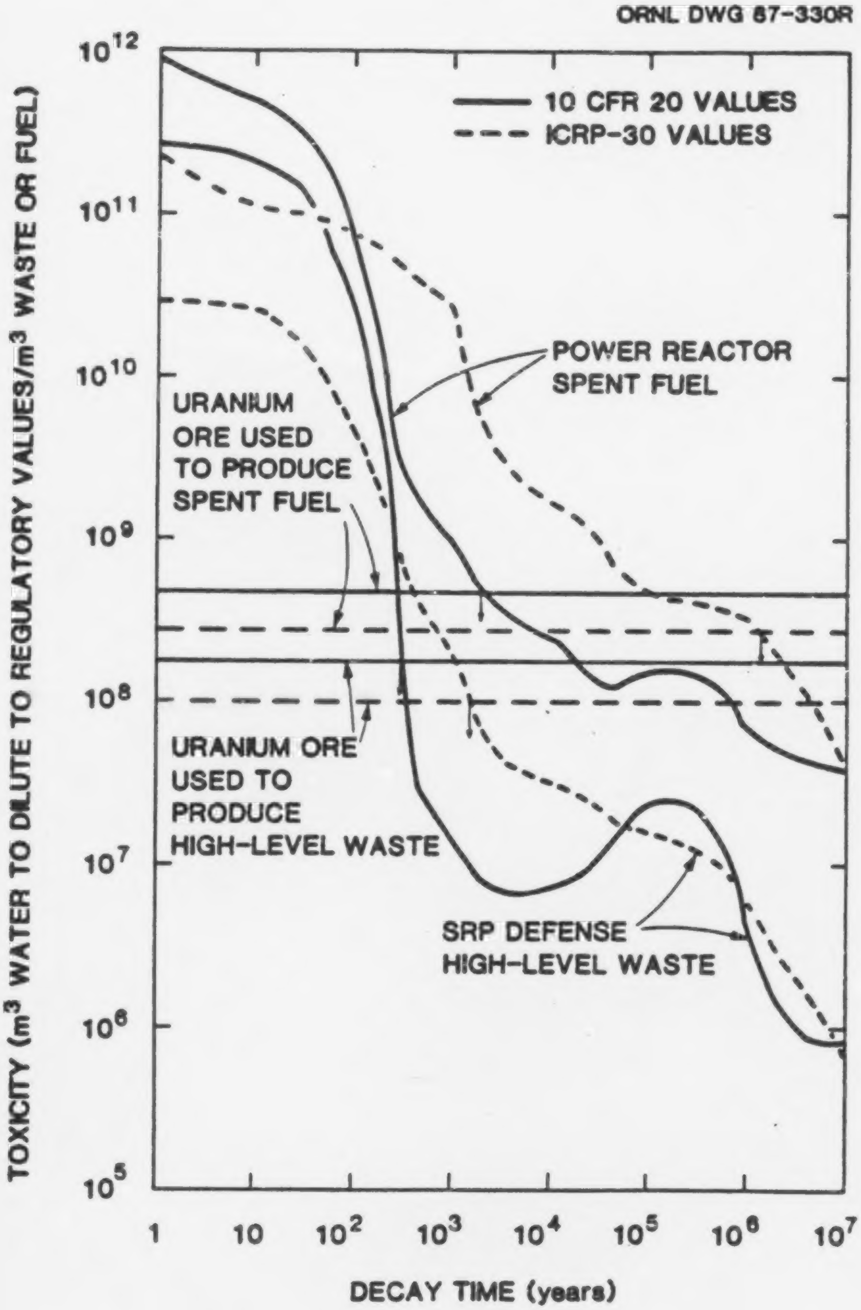
5. A.G. Croff, R.L. Haese, and N.B. Gove, Updated Decay and Photon Libraries for the ORIGEN Code, ORNL/TM-6055 (February 1979).

6. A.G. Croff, "Potential Impact of ICRP-30 on the Calculated Risk from Waste Repositories", Trans. Am. Nucl. Soc. 39, 74-75 (November 1981).

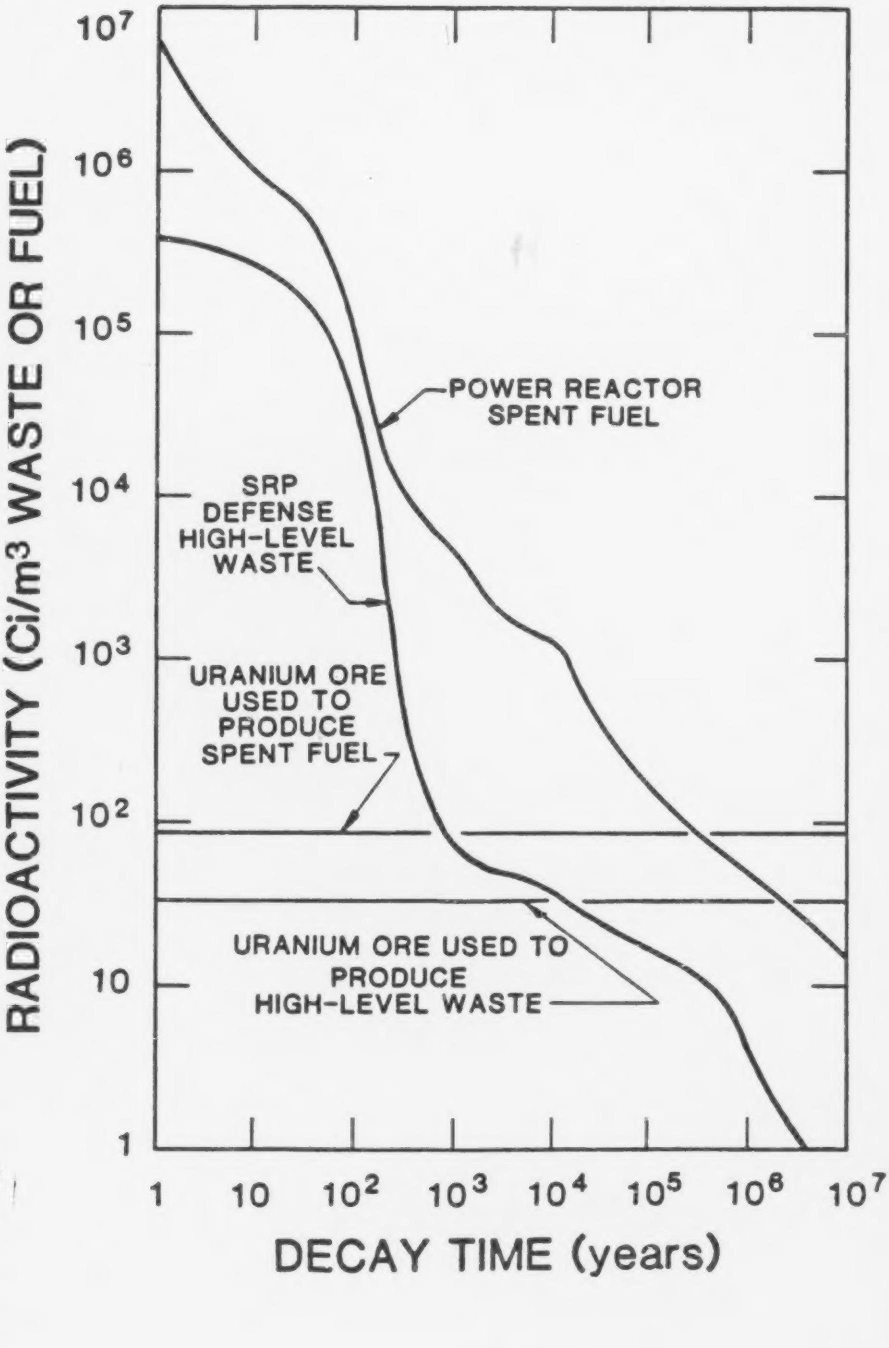
7. Office of Technology Assessment, Managing the Nation's Commercial High Level Radioactive Waste, OTA-0-171, March 1985.

ORNL DWG 87-265 R




ORNL DWG 87-330R
10 CFR 20 VALUES
ICRP-30 VALUES
POWER REACTOR SPENT FUEL
URANIUM ORE USED TO PRODUCE SPENT FUEL
URANIUM ORE USED TO PRODUCE HIGH-LEVEL WASTE
SRP DEFENSE HIGH-LEVEL WASTE
TOXICITY (m^3 WATER TO DILUTE TO REGULATORY VALUES/m^3 WASTE OR FUEL)
10^{12}
10^{11}
10^{10}
10^9
10^8
10^7
10^6
10^5
1
10
10^2
10^3
10^4
10^5
10^6
10^7
DECAY TIME (years)

ORNL DWG 87-267R



QUESTIONS FROM SENATOR JOHNSTON

Inventory of Spent Fuel

QUESTION 23: a. Please provide a table showing how much spent fuel is currently in storage at reactor sites, state by state. Name the sites in each state.

b. Please provide a table showing how much spent fuel will be stored, State by State, in 2000, assuming no spent fuel is accepted by DOE. Name the sites.

--Do the same for 2010.

--Do the same for 2020.

ANSWER: The attached table provides a state by state, reactor by reactor listing of spent fuel currently in storage and projected through the years 2000, 2010 and 2020. These projections use the 1986 EIA Upper Reference Case. Also indicated is the spent fuel pool storage capacities for each reactor as reported by the utilities.

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CUMULATIVE SPENT FUEL INVENTORY
CY-1985 SPENT FUEL DATA BASE

STATE / REACTOR OR STORAGE POOL	METRIC TONS THROUGH 1985	METRIC TONS THROUGH 2000	METRIC TONS THROUGH 2010	METRIC TONS THROUGH 2020	METRIC TONS STORAGE CAPACITY
** STATE AL					
AL FARLEY 1	160	439	634	807	648
AL FARLEY 2	86	354	533	704	649
AL BELLEFONTE 1	0	0	173	349	483
AL BELLEFONTE 2	0	17	223	390	483
AL BROWNS FERRY1	246	414	610	845	634
AL BROWNS FERRY2	221	471	667	903	633
AL BROWNS FERRY3	185	433	634	899	632
** Subtotal **	899	2128	3473	4897	
** STATE AR					
AR ARK NUCLEAR 1	175	383	486	629	449
AR ARK NUCLEAR 2	95	309	445	580	412
** Subtotal **	270	691	931	1209	
** STATE AZ					
AZ PALO VERDE 1	0	352	578	794	576
AZ PALO VERDE 2	0	358	562	748	573
AZ PALO VERDE 3	0	280	484	674	575
** Subtotal **	0	991	1624	2216	
** STATE CA					
CA DIABLO CANYON-1	0	310	509	694	608
CA DIABLO CANYON-2	0	297	489	679	608
CA HUMBOLDT BAY	29	29	29	29	36
CA RANCHO SECO-1	123	372	536	684	499
CA SAN ONOFRE 1	35	165	283	283	80
CA SAN ONOFRE 2	28	312	461	606	340
CA SAN ONOFRE 3	28	281	465	605	340
** Subtotal **	242	1766	2773	3580	
** STATE CT					
CT MILLSTONE 1	289	525	697	801	396
CT MILLSTONE 2	166	440	617	773	448
CT MILLSTONE 3	0	298	497	673	847
CT HADDAM NECK	224	425	595	595	481
** Subtotal **	679	1688	2406	2841	
** STATE FL					
FL CRYSTAL RVR 3	142	347	484	669	537
FL ST LUCIE 1	169	405	540	709	277
FL ST LUCIE 2	31	265	418	565	416

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CUMULATIVE SPENT FUEL INVENTORY
CY-1985 SPENT FUEL DATA BASE

STATE / REACTOR OR STORAGE POOL	METRIC TONS THROUGH 1985	METRIC TONS THROUGH 2000	METRIC TONS THROUGH 2010	METRIC TONS THROUGH 2020	METRIC TONS STORAGE CAPACITY
FL TURKEY PT 3	192	379	479	584	642
FL TURKEY PT 4	171	366	496	602	291
** Subtotal **					
	706	1762	2417	3129	
** STATE GA					
GA HATCH 1	216	498	659	842	589
GA HATCH 2	100	383	569	826	527
GA VOGTLE 1	0	265	463	641	432
GA VOGTLE 2	0	214	412	590	432
** Subtotal **					
	316	1360	2102	2898	
** STATE IA					
IA DUANE ARNOLD	129	313	414	543	369
** Subtotal **					
	129	313	414	543	
** STATE IL					
IL BRAIDWOOD 1	0	264	445	583	444
IL BRAIDWOOD 2	0	222	423	562	0
IL BYRON 1	0	300	467	661	444
IL BYRON 2	0	243	411	571	0
IL DRESDEN 1	70	70	70	70	73
IL DRESDEN 2	257	495	751	751	610
IL DRESDEN 3	266	461	605	748	610
IL LASALLE CTY 1	24	330	547	759	197
IL LASALLE CTY 2	0	349	589	770	197
IL QUAD CITIES 1	228	471	625	797	657
IL QUAD CITIES 2	241	485	655	829	701
IL ZION 1	233	503	683	825	950
IL ZION 2	229	505	661	825	0
IL CLINTON 1	0	324	523	676	488
IL MORRIS-BWR	361	361	361	361	STOR LOC
IL MORRIS-PWR	132	132	132	132	STOR LOC
** Subtotal **					
	2041	5516	7948	9922	
** STATE KS					
KS WOLF CREEK 1	0	283	462	632	621
** Subtotal **					
	0	283	462	632	
** STATE LA					
LA RVR BEND 1	0	314	496	706	587
LA WATERFORD 3	0	300	524	706	567

1986 UPPER REFERENCE CASE

CUMULATIVE SPENT FUEL INVENTORY
CY-1985 SPENT FUEL DATA BASE

STATE / REACTOR OR STORAGE POOL	METRIC TONS THROUGH 1985	METRIC TONS THROUGH 2000	METRIC TONS THROUGH 2010	METRIC TONS THROUGH 2020	METRIC TONS STORAGE CAPACITY
** Subtotal **	0	614	1019	1412	
** STATE MA					
MA PILGRIM 1	213	416	551	682	419
MA YANKEE-ROWE 1	83	154	154	154	171
** Subtotal **	296	570	705	836	
** STATE MD					
MD CALVERT CLF 1	208	437	574	707	315
MD CALVERT CLF 2	179	383	524	714	378
** Subtotal **	387	820	1098	1421	
** STATE ME					
ME MAINE YANKEE	297	524	654	759	558
** Subtotal **	297	524	654	759	
** STATE MI					
MI BIG ROCK 1	25	53	73	73	58
MI MIDLAND-2	0	55	227	398	LIFETIME
MI MIDLAND-1	0	0	54	146	LIFETIME
MI PALISADES	219	392	523	625	314
MI ENRICO FERMI-2	0	350	609	803	420
MI COOK 1	238	510	687	861	1028
MI COOK 2	154	458	624	842	0
** Subtotal **	636	1819	2796	3747	
** STATE MN					
MN MONTICELLO	11	204	311	410	387
MN PRAIRIE ISL 1	128	303	406	484	506
MN PRAIRIE ISL 2	146	302	404	492	0
** Subtotal **	285	810	1121	1385	
** STATE MO					
MO CALLAWAY 1	0	328	543	746	572
** Subtotal **	0	328	543	746	
** STATE MS					
MS GRAND GULF 1	0	391	646	892	912
MS GRAND GULF 2	0	0	247	541	915

1986 UPPER REFERENCE CASE

CUMULATIVE SPENT FUEL INVENTORY
CY-1985 SPENT FUEL DATA BASE

STATE / REACTOR OR STORAGE POOL	METRIC TONS THROUGH 1985	METRIC TONS THROUGH 2000	METRIC TONS THROUGH 2010	METRIC TONS THROUGH 2020	METRIC TONS STORAGE CAPACITY
** Subtotal **	0	391	893	1433	
** STATE NC					
NC BRUNSWICK 1	156	416	653	653	336
NC BRUNSWICK 2	141	371	560	744	343
NC HARRIS 1	0	206	307	421	629
NC BRUNSWICK 1 PWR	71	71	71	71	STOR LOC
NC BRUNSWICK 2 PWR	66	66	66	66	STOR LOC
NC MCGUIRE 1	62	345	520	662	626
NC MCGUIRE 2	22	302	476	637	625
** Subtotal **	518	1778	2653	3255	
** STATE NE					
NE COOPER STN	164	421	582	742	434
NE FORT CALHOUN	126	253	327	400	263
** Subtotal **	291	674	909	1142	
** STATE NH					
NH SEABROOK 1	0	236	400	581	570
NH SEABROOK 2	0	0	183	389	570
** Subtotal **	0	236	583	970	
** STATE NJ					
NJ OYSTER CRK 1	227	447	687	687	469
NJ HOPE CREEK	0	314	540	758	725
NJ SALEM UNIT 1	124	450	661	898	537
NJ SALEM UNIT 2	53	382	613	790	538
** Subtotal **	404	1593	2501	3133	
** STATE NY					
NY INDIAN PT 1	31	31	31	31	144
NY INDIAN PT 2	179	438	586	718	443
NY SHOREHAM	0	170	310	467	489
NY NINE MILE PT1	235	459	585	675	494
NY NINE MILE PT2	0	208	371	530	683
NY FITZPATRICK	189	452	598	792	515
NY INDIAN PT 3	133	395	560	728	601
NY GINNA	171	307	392	432	359
NY WEST VALLEY-B	11	11	11	11	STOR LOC
NY WEST VALLEY-P	15	15	15	15	STOR LOC

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CUMULATIVE SPENT FUEL INVENTORY
CY-1985 SPENT FUEL DATA BASE

STATE / REACTOR OR STORAGE POOL	METRIC TONS THROUGH 1985	METRIC TONS THROUGH 2000	METRIC TONS THROUGH 2010	METRIC TONS THROUGH 2020	METRIC TONS STORAGE CAPACITY
** Subtotal **	964	2486	3459	4398	
** STATE OH					
OH PERRY 1	0	367	597	780	295
OH PERRY 2	0	206	454	739	437
OH DAVIS-BESSE 1	93	330	463	657	335
** Subtotal **	93	904	1514	2176	
** STATE OR					
OR TROJAN	147	432	611	803	649
** Subtotal **	147	432	611	803	
** STATE PA					
PA B VALLEY 1	100	406	593	768	384
PA B VALLEY 2	0	191	323	477	502
PA 3 MILE ISL 1	97	347	530	690	1059
PA SUSQUEHANNA 1	35	380	591	796	496
PA SUSQUEHANNA 2	0	338	521	733	495
PA LIMERICK 1	0	302	510	712	364
PA LIMERICK 2	0	213	420	633	364
PA PEACHBOTTOM 2	272	613	802	1032	507
PA PEACHBOTTOM 3	279	575	804	1002	508
** Subtotal **	783	3365	5094	6843	
** STATE SC					
SC ROBINSON 2	96	296	429	516	231
SC CATAWBA 1	0	276	454	619	1106
SC CATAWBA 2	0	250	407	551	1106
SC OCONEE 1	268	549	729	857	608
SC OCONEE 2	191	444	599	745	0
SC OCONEE 3	180	413	562	712	382
SC SUMMER 1	51	312	459	630	591
** Subtotal **	786	2540	3639	4630	
** STATE TN					
TN SEQUOYAH 1	97	346	521	692	636
TN SEQUOYAH 2	62	345	519	693	0
TN WATTS BAR 1	0	166	364	506	605
TN WATTS BAR 2	0	167	337	476	0
** Subtotal **	160	1024	1740	2366	

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CUMULATIVE SPENT FUEL INVENTORY
CY-1985 SPENT FUEL DATA BASE

STATE / REACTOR OR STORAGE POOL	METRIC TONS THROUGH 1985	METRIC TONS THROUGH 2000	METRIC TONS THROUGH 2010	METRIC TONS THROUGH 2020	METRIC TONS STORAGE CAPACITY
** STATE TX					
TX SOUTH TEXAS, UNIT 1	0	293	498	681	920
TX SOUTH TEXAS, UNIT 2	0	240	445	631	920
TX COMANCHE PK 1	0	307	496	671	563
TX COMANCHE PK 2	0	230	417	595	554
** Subtotal **	0	1070	1857	2578	
** STATE VA					
VA NORTH ANNA 1	137	385	525	706	801
VA NORTH ANNA 2	80	327	489	640	0
VA SURRY 1	215	418	551	641	477
VA SURRY 2	164	373	491	601	0
** Subtotal **	597	1503	2056	2589	
** STATE VT					
VT VT YANKEE 1	246	439	549	655	530
** Subtotal **	246	439	549	655	
** STATE WA					
WA WNP-1	0	0	162	398	492
WA WASH NUCLEAR 2	0	361	589	805	471
WA WNP-3	0	148	442	705	574
** Subtotal **	0	510	1193	1907	
** STATE WI					
WI LACROSSE	27	53	73	73	58
WI POINT BEACH 1	160	314	406	449	560
WI POINT BEACH 2	153	305	396	457	0
WI KEWAUNEE	138	320	433	523	369
** Subtotal **	478	992	1308	1502	
** STATE					
GENERIC REACTORS	0	0	3871	23758	LIFETIME
** Subtotal **	0	0	3871	23758	
*** Total ***	12650	41919	66917	106312	

QUESTIONS FROM SENATOR JOHNSTON

QUESTION 24a: How will the schedule adjustments included in the draft amendments to the Mission Plan affect the rate of spent fuel acceptance at a repository and at an MRS?

ANSWER: The effect of the schedule adjustment on waste acceptance is shown by comparing the two attached suggested waste acceptance tables, Table 2-3 from the June 1985 Mission Plan and Table F-1 from the January 1987 Draft Mission Plan Amendment. Waste will be accepted at the repository at the same rate, which includes the initial ramp-up, only it will start five years later, in 2003 versus 1998.

Table 2-3. Waste-Acceptance Schedule--Improved-Performance System
(Metric tons of uranium (MTU) per year)

Year	Spent-Fuel Generation[a]		MRS Acceptance	MRS Inventory[b]	First Repository				Second Repository		Cumulative Spent-Fuel Acceptance	Spent-Fuel Backlog
	Annual	Cumulative			SF from MRS	High-Level Waste[c]	Total	Cumulative Total Waste	Spent Fuel	Cumulative		
Pre 1998		40,100	2200	2,200							2,200	37,900
1998	2900	43,000	3000	4,800	400		400	400			5,200	37,800
1999	3000	46,000	3000	7,400	400		400	800			8,200	37,800
2000	3000	49,000	3000	10,000	400		400	1,200			11,200	37,800
2001	3000	52,000	3000	12,100	900		900	2,100			14,200	37,800
2002	3000	55,000	3000	13,300	1800		1800	3,900			17,200	37,800
2003	3100	58,100	3000	13,300	3000	400	3400	7,300			20,200	37,900
2004	3300	61,400	3000	13,300	3000	400	3400	10,700			23,200	38,200
2005	3400	64,800	3000	13,300	3000	400	3400	14,100			26,200	38,600
2006	3800	68,600	3000	13,300	3000	400	3400	17,500	900	900	30,100	38,500
2007	4100	72,700	3000	13,300	3000	400	3400	20,900	1800	2,700	34,900	37,800
2008	4700	77,400	3000	13,300	3000	400	3400	24,300	1800	4,500	39,700	37,700
2009	4500	81,900	3000	13,300	3000	400	3400	27,700	1800	6,300	44,500	37,400
2010	4500	86,400	3000	13,300	3000	400	3400	31,100	1800	8,100	49,300	37,100
2011	4000	90,400	3000	13,300	3000	400	3400	34,500	2400	10,500	54,700	35,700
2012	4100	94,500	3000	13,300	3000	400	3400	37,900	3000	13,500	60,700	33,800
2013	4200	98,700	3000	13,300	3000	400	3400	41,300	3000	16,500	66,700	32,000
2014	4200	102,900	3000	13,300	3000	400	3400	44,700	3000	19,500	72,700	30,200
2015	4300	107,200	3000	13,300	3000	400	3400	48,100	3000	22,500	78,700	28,500
2016	4300	111,500	3000	13,300	3000	400	3400	51,500	3000	25,500	84,700	26,800
2017	4500	116,000	2000	13,100	3000	400	3400	54,900	3000	28,500	90,500	25,500
2018	4700	120,700		10,100	3000	400	3400	58,300	3000	31,500	93,500	27,200
2019	4700	125,400		7,100	3000	400	3400	61,700	3000	34,500	96,500	28,900
2020	4900	130,300		4,100	3000	400	3400	65,100	3000	37,500	99,500	30,800
2021				1,100	3000	400	3400	68,500	3000	40,500	102,500	27,800
2022					1100	400	1500	70,000	3000	43,500	105,500	24,800
2023									3000	46,500	108,500	21,800
2024									3000	49,500	111,800	18,800
2025									3000	52,500	114,500	15,800
2026						8000			3000	55,500	117,500	12,800
2027									3000	58,500	120,500	9,800
2028									3000	61,500	123,500	6,800
2029									3000	64,500	126,500	3,800
2030									3000	67,500	129,500	800
2031									800	68,300	130,300	

[a] Data from Commercial Nuclear Power 1984: Prospects for the United States and the World, DOE/EIA 0438(84), November 1984. Includes discharge from decommissioned reactors.

[b] The MRS facility is assumed to reach a constant acceptance rate and discharge to the first repository as fast as the first repository can accept spent fuel. The MRS facility will stop accepting spent fuel when its inventory will fill the first repository.

[c] See footnotes b and c in Table 2-2.

Table F-1. Illustrative waste-acceptance schedule
(All quantities in metric tons of uranium)

Year	MRS facility			First repository		Second repository		Total system acceptance	
	Spent fuel received	In storage	Spent fuel shipped	Spent fuel	HLW	Spent fuel	HLW	Spent fuel	HLW and spent fuel
1998	1200	1200						1200	1200
1999	1200	2400						1200	1200
2000	1200	3600						1200	1200
2001	1200	4800						1200	1200
2002	1200	6000						1200	1200
2003	2000	7600	400	400				2000	2000
2004	2650	9850	400	400				2650	2650
2005	2650	12100	400	400				2650	2650
2006	2650	13850	900	900				2650	2650
2007	2650	14700[A]	1800	1800				2650	2650
2008	2650	14700	2650	3000[B]	400			3000	3400
2009	2650	14700	2650	3000	400			3000	3400
2010	2650	14700	2650	3000	400			3000	3400
2011	2650	14700	2650	3000	400			3000	3400
2012	2650	14700	2650	3000	400			3000	3400
2013	2650	14700	2650	3000	400			3000	3400
2014	2650	14700	2650	3000	400			3000	3400
2015	2650	14700	2650	3000	400			3000	3400
2016	2650	14700	2650	3000	400			3000	3400
2017	2650	14700	2650	3000	400			3000	3400
2018	2650	14700	2650	3000	400			3000	3400
2019	2650	14700	2650	3000	240			3000	3240
2020	2650	14700	2650	3000				3000	3000
2021	2650	14700	2650	3000				3000	3000
2022	2650	14700	2650	3000				3000	3000
2023	1410	13460	2650	3000		900		2660	2660
2024		10460	3000	3000		1800		1800	1800
2025		7460	3000	3000		3000	400	3000	3400
2026		4460	3000	3000		3000	400	3000	3400
2027		1460	3000	3000		3000	400	3000	3400
2028		0	1460	1460		3000	400	3000	3400
2029						3000	400	3000	3400
2030						3000	400	3000	3400
2031						3000	400	3000	3400
2032						3000	400	3000	3400
2033						3000	400	3000	3400
2034						3000	400	3000	3400
2035						3000		3000	3000
2036						3000		3000	3000
2037						1940		1940	1940
2038									
Total	59,760		59,760	65,360	4640	40,640	4000	106,000	114,640

[A] Maximum quantity stored at the MRS facility is 14,700 MTU.

[B] In years when the repository acceptance does not match MRS facility shipments, the difference is attributable to shipments from nearby reactors directly to the repository.

QUESTIONS FROM SENATOR JOHNSTON

QUESTION 24(b): If the Mission Plan amendments are made effective, in what year will DOE begin taking spent fuel at an MRS, and at what rate?

ANSWER: If the Mission Plan amendments are made effective and the DOE MRS proposal is approved in fiscal year 1987, the MRS should begin to accept spent fuel by 1998 at 1200 MTU per year.

QUESTIONS FROM SENATOR JOHNSTON

QUESTION 24(c): What year for a repository, and at what rate?

ANSWER: The repository would receive spent fuel by 2003 at an initial rate of 400 MTU.

QUESTIONS FROM SENATOR JOHNSTON

QUESTION 24d: According to DOE's revised schedule in the Mission Plan amendments, slightly over 13,000 metric tons of uranium would be accepted by 2005, compared to just over 26,000 metric tons that would be accepted by 2005 under the previous schedule. Under the new schedule, 27,000 metric tons would be accepted by 2010, compared to 49,000 metric tons by 2010 under the previous schedule.

-- How are these reduced levels of waste acceptance reconciled with utilities' need for spent fuel storage space?

-- How much spent fuel is currently in storage at reactor sites?

-- How much will be in storage by 2005? 2010?

ANSWER: The utility storage requirements can be determined from the attached data sheets. The amount of expected spent fuel to be generated by the reactors in each State is shown for the years 1985, 2000, 2010 and 2020. The last column shows the total storage capacity for each reactor or storage pool. When the total amount of spent fuel inventory exceeds the storage capacity, the utility must take some corrective action if the Department has not accepted some of this spent fuel for disposal.

Based on information soon to be published, the shortfall of current or planned utility storage capacity versus cumulative spent fuel inventory can be calculated. Using an upper reference case and assuming increased use of extended burnup fuel as discussed in the DOE's Energy Information

ANSWER 24d: (Cont'd)

Administration's spent fuel discharge projections, Table E 2. attached (from the report World Nuclear Fuel Cycle Requirements 1986), the Department has calculated the following need for additional storage requirements. These additional storage requirements vary depending on the waste acceptance schedules used. For comparison, the two waste acceptance schedules in the June 1985 Mission Plan and the one schedule in the January 1987 Draft Mission Plan Amendment are shown.

Storage Capacity Shortfall (MTU)

	June 1985 Mission Plan		January 1987 Amendment
	Authorized System	Improved Performance With MRS	With MRS
Max(Year)	4881 (2001)	2165 (1996)	3807 (2003)
2005	3426	760	3322
2010	728	41	2434

From Table E 2. the amount of spent fuel currently in storage is 15,300 MTU.

The amount in storage in the years 2005 and 2010 will be the amounts identified in Table E 2., depending on which case is assumed, minus the amount delivered to the repository or MRS depending on which waste acceptance table is assumed.

ANSWER 24d: (Cont'd)

A number of actions are open to the utilities to increase spent fuel storage at their sites and include: expansion of storage pools, reracking to increase storage of pools, licensed dry storage, transshipment, etc. DOE is continuing to work with utilities in cooperative agreements to encourage and expedite the efficient use of existing storage facilities and the addition of new capacity.

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CUMULATIVE SPENT FUEL INVENTORY
CY-1985 SPENT FUEL DATA BASE

STATE / REACTOR OR STORAGE POOL	METRIC TONS THROUGH 1985	METRIC TONS THROUGH 2000	METRIC TONS THROUGH 2010	METRIC TONS THROUGH 2020	METRIC TONS STORAGE CAPACITY
** STATE AL					
AL FARLEY 1	160	439	634	807	648
AL FARLEY 2	86	354	533	704	649
AL BELLEFONTE 1	0	0	173	349	483
AL BELLEFONTE 2	0	17	223	390	483
AL BROWNS FERRY1	246	414	610	845	634
AL BROWNS FERRY2	221	471	667	903	633
AL BROWNS FERRY3	185	433	634	899	632
AL GENERIC BWR REACTOR	0	0	111	360	LIFETIME
AL GENERIC BWR REACTOR	0	0	0	243	LIFETIME
AL GENERIC BWR REACTOR	0	0	0	243	LIFETIME
AL GENERIC BWR REACTOR	0	0	0	71	LIFETIME
AL GENERIC BWR REACTOR	0	0	0	36	LIFETIME
AL GENERIC PWR REACTOR	0	0	38	285	LIFETIME
AL GENERIC PWR REACTOR	0	0	0	173	LIFETIME
AL GENERIC PWR REACTOR	0	0	0	107	LIFETIME
AL GENERIC PWR REACTOR	0	0	0	106	LIFETIME
** Subtotal **	899	2128	3622	6521	
** STATE AR					
AR ARK NUCLEAR 1	175	383	486	629	449
AR ARK NUCLEAR 2	95	309	445	580	412
AR GENERIC BWR REACTOR	0	0	0	106	LIFETIME
AR GENERIC PWR REACTOR	0	0	0	144	LIFETIME
** Subtotal **	270	691	931	1458	
** STATE AZ					
AZ PALO VERDE 1	0	352	578	794	576
AZ PALO VERDE 2	0	358	562	748	573
AZ PALO VERDE 3	0	280	484	674	575
AZ GENERIC PWR REACTOR	0	0	0	35	LIFETIME
** Subtotal **	0	991	1624	2250	
** STATE CA					
CA DIABLO CANYON-1	0	310	509	694	608
CA DIABLO CANYON-2	0	297	489	679	608
CA HUMBOLDT BAY	29	29	29	29	36
CA RANCHO SECO-1	123	372	536	684	499
CA SAN ONOFRE 1	35	165	283	283	80
CA SAN ONOFRE 2	28	312	461	606	340
CA SAN ONOFRE 3	28	281	465	605	340
CA GENERIC BWR REACTOR	0	0	111	359	LIFETIME
CA GENERIC BWR REACTOR	0	0	64	304	LIFETIME

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CUMULATIVE SPENT FUEL INVENTORY
CY-1985 SPENT FUEL DATA BASE

STATE / REACTOR OR STORAGE POOL	METRIC TONS THROUGH 1985	METRIC TONS THROUGH 2000	METRIC TONS THROUGH 2010	METRIC TONS THROUGH 2020	METRIC TONS STORAGE CAPACITY
CA GENERIC BWR REACTOR	0	0	0	175	LIFETIME
CA GENERIC PWR REACTOR	0	0	186	388	LIFETIME
CA GENERIC PWR REACTOR	0	0	30	239	LIFETIME
CA GENERIC PWR REACTOR	0	0	0	213	LIFETIME
CA GENERIC PWR REACTOR	0	0	0	174	LIFETIME
CA GENERIC PWR REACTOR	0	0	0	144	LIFETIME
CA GENERIC PWR REACTOR	0	0	0	106	LIFETIME
CA GENERIC PWR REACTOR	0	0	0	106	LIFETIME
CA GENERIC PWR REACTOR	0	0	0	74	LIFETIME
CA GENERIC PWR REACTOR	0	0	0	31	LIFETIME
** Subtotal **	242	1766	3165	5893	
** STATE CT					
CT MILLSTONE 1	289	525	697	801	396
CT MILLSTONE 2	166	440	617	773	448
CT MILLSTONE 3	0	298	497	673	847
CT HADDAM NECK	224	425	595	595	481
CT GENERIC PWR REACTOR	0	0	0	107	LIFETIME
** Subtotal **	679	1688	2406	2948	
** STATE FL					
FL CRYSTAL RVR 3	142	347	484	669	537
FL ST LUCIE 1	169	405	540	709	277
FL ST LUCIE 2	31	265	418	565	416
FL TURKEY PT 3	192	379	479	584	642
FL TURKEY PT 4	171	366	496	602	291
FL GENERIC BWR REACTOR	0	0	73	282	LIFETIME
FL GENERIC BWR REACTOR	0	0	0	106	LIFETIME
FL GENERIC PWR REACTOR	0	0	112	352	LIFETIME
FL GENERIC PWR REACTOR	0	0	0	143	LIFETIME
FL GENERIC PWR REACTOR	0	0	0	107	LIFETIME
** Subtotal **	706	1762	2602	4117	
** STATE GA					
GA HATCH 1	216	498	659	842	589
GA HATCH 2	100	383	569	826	527
GA VOGTLE 1	0	265	463	641	432
GA VOGTLE 2	0	214	412	590	432
GA GENERIC PWR REACTOR	0	0	178	418	LIFETIME
GA GENERIC PWR REACTOR	0	0	128	364	LIFETIME
** Subtotal **	316	1360	2409	3681	

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CUMULATIVE SPENT FUEL INVENTORY
CY-1985 SPENT FUEL DATA BASE

STATE / REACTOR OR STORAGE POOL	METRIC TONS THROUGH 1985	METRIC TONS THROUGH 2000	METRIC TONS THROUGH 2010	METRIC TONS THROUGH 2020	METRIC TONS STORAGE CAPACITY
** STATE IA					
IA DUANE ARNOLD	129	313	414	543	369
IA GENERIC PWR REACTOR	0	0	63	299	LIFETIME
IA GENERIC PWR REACTOR	0	0	0	173	LIFETIME
** Subtotal **	129	313	477	1016	
** STATE IL					
IL BRAIDWOOD 1	0	264	445	583	444
IL BRAIDWOOD 2	0	222	423	562	0
IL BYRON 1	0	300	467	661	444
IL BYRON 2	0	243	411	571	0
IL DRESDEN 1	70	70	70	70	73
IL DRESDEN 2	257	495	751	751	610
IL DRESDEN 3	266	461	605	748	610
IL LASALLE CTY 1	24	330	547	759	197
IL LASALLE CTY 2	0	349	589	770	197
IL QUAD CITIES 1	228	471	625	797	657
IL QUAD CITIES 2	241	485	655	829	701
IL ZION 1	233	503	683	825	950
IL ZION 2	229	505	661	825	0
IL CLINTON 1	0	324	523	676	488
IL MORRIS-BWR	361	361	361	361	STOR LOC
IL MORRIS-PWR	132	132	132	132	STOR LOC
IL GENERIC BWR REACTOR	0	0	179	428	LIFETIME
IL GENERIC BWR REACTOR	0	0	186	395	LIFETIME
IL GENERIC PWR REACTOR	0	0	111	351	LIFETIME
IL GENERIC PWR REACTOR	0	0	109	311	LIFETIME
IL GENERIC PWR REACTOR	0	0	0	239	LIFETIME
IL GENERIC PWR REACTOR	0	0	0	144	LIFETIME
IL GENERIC PWR REACTOR	0	0	0	106	LIFETIME
** Subtotal **	2041	5516	8534	11895	
** STATE KS					
KS WOLF CREEK 1	0	283	462	632	621
** Subtotal **	0	283	462	632	
** STATE LA					
LA RVR BEND 1	0	314	496	706	587
LA WATERFORD 3	0	300	524	706	567
LA GENERIC PWR REACTOR	0	0	0	212	LIFETIME
LA GENERIC PWR REACTOR	0	0	0	174	LIFETIME
** Subtotal **	0	614	1019	1798	

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CUMULATIVE SPENT FUEL INVENTORY
CY-1985 SPENT FUEL DATA BASE

STATE / REACTOR OR STORAGE POOL	METRIC TONS THROUGH 1985	METRIC TONS THROUGH 2000	METRIC TONS THROUGH 2010	METRIC TONS THROUGH 2020	METRIC TONS STORAGE CAPACITY
** STATE MA					
MA PILGRIM 1	213	416	551	682	419
MA YANKEE-ROWE 1	83	154	154	154	171
MA GENERIC PWR REACTOR	0	0	63	299	LIFETIME
MA GENERIC PWR REACTOR	0	0	0	240	LIFETIME
MA GENERIC PWR REACTOR	0	0	0	31	LIFETIME
** Subtotal **	296	570	768	1406	
** STATE MD					
MD CALVERT CLF 1	208	437	574	707	315
MD CALVERT CLF 2	179	383	524	714	378
MD GENERIC BWR REACTOR	0	0	32	242	LIFETIME
MD GENERIC BWR REACTOR	0	0	0	216	LIFETIME
MD GENERIC PWR REACTOR	0	0	109	311	LIFETIME
MD GENERIC PWR REACTOR	0	0	0	173	LIFETIME
** Subtotal **	387	820	1239	2364	
** STATE ME					
ME MAINE YANKEE	297	524	654	759	558
ME GENERIC BWR REACTOR	0	0	130	370	LIFETIME
** Subtotal **	297	524	784	1129	
** STATE MI					
MI BIG ROCK 1	25	53	73	73	58
MI MIDLAND-2	0	55	227	398	LIFETIME
MI MIDLAND-1	0	0	54	146	LIFETIME
MI PALISADES	219	392	523	625	314
MI ENRICO FERMI-2	0	350	609	803	420
MI COOK 1	238	510	687	861	1028
MI COOK 2	154	458	624	842	0
MI GENERIC BWR REACTOR	0	0	40	291	LIFETIME
MI GENERIC BWR REACTOR	0	0	0	106	LIFETIME
MI GENERIC BWR REACTOR	0	0	0	36	LIFETIME
MI GENERIC PWR REACTOR	0	0	129	364	LIFETIME
MI GENERIC PWR REACTOR	0	0	64	299	LIFETIME
MI GENERIC PWR REACTOR	0	0	0	207	LIFETIME
MI GENERIC PWR REACTOR	0	0	0	173	LIFETIME
MI GENERIC PWR REACTOR	0	0	0	178	LIFETIME
MI GENERIC PWR REACTOR	0	0	0	144	LIFETIME
MI GENERIC PWR REACTOR	0	0	0	74	LIFETIME
** Subtotal **	636	1819	3029	5618	

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CUMULATIVE SPENT FUEL INVENTORY
CY-1985 SPENT FUEL DATA BASE

STATE / REACTOR OR STORAGE POOL	METRIC TONS THROUGH 1985	METRIC TONS THROUGH 2000	METRIC TONS THROUGH 2010	METRIC TONS THROUGH 2020	METRIC TONS STORAGE CAPACITY
** STATE MN					
MN MONTICELLO	11	204	311	410	387
MN PRAIRIE ISL 1	128	303	406	484	506
MN PRAIRIE ISL 2	146	302	404	492	0
MN GENERIC BWR REACTOR	0	0	32	242	LIFETIME
** Subtotal **	285	810	1153	1627	
** STATE MO					
MO CALLAWAY 1	0	328	543	746	572
** Subtotal **	0	328	543	746	
** STATE MS					
MS GRAND GULF 1	0	391	646	892	912
MS GRAND GULF 2	0	0	247	541	915
MS GENERIC BWR REACTOR	0	0	0	175	LIFETIME
MS GENERIC PWR REACTOR	0	0	0	212	LIFETIME
MS GENERIC PWR REACTOR	0	0	0	106	LIFETIME
** Subtotal **	0	391	893	1926	
** STATE NC					
NC BRUNSWICK 1	156	416	653	653	336
NC BRUNSWICK 2	141	371	560	744	343
NC HARRIS 1	0	206	307	421	629
NC BRUNSWICK 1 PWR	71	71	71	71	STOR LOC
NC BRUNSWICK 2 PWR	66	66	66	66	STOR LOC
NC MCGUIRE 1	62	345	520	662	626
NC MCGUIRE 2	22	302	476	637	625
NC GENERIC BWR REACTOR	0	0	108	317	LIFETIME
NC GENERIC BWR REACTOR	0	0	0	175	LIFETIME
NC GENERIC PWR REACTOR	0	0	167	398	LIFETIME
NC GENERIC PWR REACTOR	0	0	110	312	LIFETIME
NC GENERIC PWR REACTOR	0	0	30	239	LIFETIME
NC GENERIC PWR REACTOR	0	0	30	239	LIFETIME
NC GENERIC PWR REACTOR	0	0	0	213	LIFETIME
NC GENERIC PWR REACTOR	0	0	0	174	LIFETIME
** Subtotal **	518	1778	3099	5321	
** STATE NE					
NE COOPER STN	164	421	582	742	434
NE FORT CALHOUN	126	253	327	400	263
NE GENERIC PWR REACTOR	0	0	0	107	LIFETIME
NE GENERIC PWR REACTOR	0	0	0	31	LIFETIME

1986 UPPER REFERENCE CASE

CUMULATIVE SPENT FUEL INVENTORY
CY-1985 SPENT FUEL DATA BASE

STATE / REACTOR OR STORAGE POOL	METRIC TONS THROUGH 1985	METRIC TONS THROUGH 2000	METRIC TONS THROUGH 2010	METRIC TONS THROUGH 2020	METRIC TONS STORAGE CAPACITY
** Subtotal **	291	674	909	1280	
** STATE NH					
NH SEABROOK 1	0	236	400	581	570
NH SEABROOK 2	0	0	183	389	570
** Subtotal **	0	236	583	970	
** STATE NJ					
NJ OYSTER CRK 1	227	447	687	687	469
NJ HOPE CREEK	0	314	540	758	725
NJ SALEM UNIT 1	124	450	661	898	537
NJ SALEM UNIT 2	53	382	613	790	538
NJ GENERIC BWR REACTOR	0	0	143	391	LIFETIME
NJ GENERIC PWR REACTOR	0	0	103	334	LIFETIME
NJ GENERIC PWR REACTOR	0	0	38	285	LIFETIME
NJ GENERIC PWR REACTOR	0	0	0	240	LIFETIME
** Subtotal **	404	1593	2785	4383	
** STATE NY					
NY INDIAN PT 1	31	31	31	31	144
NY INDIAN PT 2	179	438	586	718	443
NY SHOREHAM	0	170	310	467	489
NY NINE MILE PT1	235	459	585	675	494
NY NINE MILE PT2	0	208	371	530	683
NY FITZPATRICK	189	452	598	792	515
NY INDIAN PT 3	133	395	560	728	601
NY GINNA	171	307	392	432	359
NY WEST VALLEY-B	11	11	11	11	STOR LOC
NY WEST VALLEY-P	15	15	15	15	STOR LOC
NY GENERIC BWR REACTOR	0	0	0	145	LIFETIME
NY GENERIC BWR REACTOR	0	0	0	106	LIFETIME
NY GENERIC PWR REACTOR	0	0	0	204	LIFETIME
NY GENERIC PWR REACTOR	0	0	0	175	LIFETIME
NY GENERIC PWR REACTOR	0	0	0	107	LIFETIME
NY GENERIC PWR REACTOR	0	0	0	74	LIFETIME
NY GENERIC PWR REACTOR	0	0	0	34	LIFETIME
** Subtotal **	964	2486	3459	5243	
** STATE OH					
OH PERRY 1	0	367	597	780	295
OH PERRY 2	0	206	454	739	437
OH DAVIS-BESSE 1	93	330	463	657	335
OH GENERIC BWR REACTOR	0	0	0	33	LIFETIME

1986 UPPER REFERENCE CASE

CUMULATIVE SPENT FUEL INVENTORY
CY-1985 SPENT FUEL DATA BASE

STATE / REACTOR OR STORAGE POOL	METRIC TONS THROUGH 1985	METRIC TONS THROUGH 2000	METRIC TONS THROUGH 2010	METRIC TONS THROUGH 2020	METRIC TONS STORAGE CAPACITY
OH GENERIC PWR REACTOR	0	0	0	106	LIFETIME
OH GENERIC PWR REACTOR	0	0	0	106	LIFETIME
OH GENERIC PWR REACTOR	0	0	0	32	LIFETIME
** Subtotal **	93	904	1514	2454	
** STATE OR					
OR TROJAN	147	432	611	803	649
** Subtotal **	147	432	611	803	
** STATE PA					
PA B VALLEY 1	100	406	593	768	384
PA B VALLEY 2	0	191	323	477	502
PA 3 MILE ISL 1	97	347	530	690	1059
PA SUSQUEHANNA 1	35	380	591	796	496
PA SUSQUEHANNA 2	0	338	521	733	495
PA LIMERICK 1	0	302	510	712	364
PA LIMERICK 2	0	213	420	633	364
PA PEACHBOTTOM 2	272	613	802	1032	507
PA PEACHBOTTOM 3	279	575	804	1002	508
PA GENERIC BWR REACTOR	0	0	0	208	LIFETIME
PA GENERIC BWR REACTOR	0	0	0	145	LIFETIME
PA GENERIC BWR REACTOR	0	0	0	106	LIFETIME
PA GENERIC PWR REACTOR	0	0	184	387	LIFETIME
PA GENERIC PWR REACTOR	0	0	0	107	LIFETIME
PA GENERIC PWR REACTOR	0	0	0	106	LIFETIME
PA GENERIC PWR REACTOR	0	0	0	71	LIFETIME
PA GENERIC PWR REACTOR	0	0	0	31	LIFETIME
** Subtotal **	783	3365	5278	8004	
** STATE RI					
RI GENERIC PWR REACTOR	0	0	0	173	LIFETIME
RI GENERIC PWR REACTOR	0	0	0	144	LIFETIME
** Subtotal **	0	0	0	317	
** STATE SC					
SC ROBINSON 2	96	296	429	516	231
SC CATAWBA 1	0	276	454	619	1106
SC CATAWBA 2	0	250	407	551	1106
SC OCONEE 1	268	549	729	857	608
SC OCONEE 2	191	444	599	745	0
SC OCONEE 3	180	413	562	712	382
SC SUMMER 1	51	312	459	630	591
SC GENERIC BWR REACTOR	0	0	0	175	LIFETIME

1986 UPPER REFERENCE CASE

CUMULATIVE SPENT FUEL INVENTORY
CY-1985 SPENT FUEL DATA BASE

STATE / REACTOR OR STORAGE POOL	METRIC TONS THROUGH 1985	METRIC TONS THROUGH 2000	METRIC TONS THROUGH 2010	METRIC TONS THROUGH 2020	METRIC TONS STORAGE CAPACITY
SC GENERIC BWR REACTOR	0	0	0	145	LIFETIME
SC GENERIC BWR REACTOR	0	0	0	106	LIFETIME
SC GENERIC BWR REACTOR	0	0	0	33	LIFETIME
SC GENERIC PWR REACTOR	0	0	186	388	LIFETIME
** Subtotal **	786	2540	3824	5477	
** STATE TN					
TN SEQUOYAH 1	97	346	521	692	636
TN SEQUOYAH 2	62	345	519	693	0
TN WATTS BAR 1	0	166	364	506	605
TN WATTS BAR 2	0	167	337	476	0
TN GENERIC BWR REACTOR	0	0	0	106	LIFETIME
TN GENERIC BWR REACTOR	0	0	0	74	LIFETIME
TN GENERIC PWR REACTOR	0	0	0	106	LIFETIME
TN GENERIC PWR REACTOR	0	0	0	74	LIFETIME
TN GENERIC PWR REACTOR	0	0	0	34	LIFETIME
TN GENERIC PWR REACTOR	0	0	0	34	LIFETIME
** Subtotal **	160	1024	1740	2795	
** STATE TX					
TX SOUTH TEXAS, UNIT 1	0	293	498	681	920
TX SOUTH TEXAS, UNIT 2	0	240	445	631	920
TX COMANCHE PK 1	0	307	496	671	563
TX COMANCHE PK 2	0	230	417	595	554
TX GENERIC BWR REACTOR	0	0	108	317	LIFETIME
TX GENERIC BWR REACTOR	0	0	0	106	LIFETIME
TX GENERIC PWR REACTOR	0	0	129	364	LIFETIME
TX GENERIC PWR REACTOR	0	0	30	239	LIFETIME
TX GENERIC PWR REACTOR	0	0	0	32	LIFETIME
** Subtotal **	0	1070	2124	3635	
** STATE VA					
VA NORTH ANNA 1	137	385	525	706	801
VA NORTH ANNA 2	80	327	489	640	0
VA SURRY 1	215	418	551	641	477
VA SURRY 2	164	373	491	601	0
VA GENERIC BWR REACTOR	0	0	0	36	LIFETIME
VA GENERIC PWR REACTOR	0	0	112	352	LIFETIME
VA GENERIC PWR REACTOR	0	0	73	276	LIFETIME
VA GENERIC PWR REACTOR	0	0	0	106	LIFETIME
** Subtotal **	597	1503	2241	3360	

1986 UPPER REFERENCE CASE

CUMULATIVE SPENT FUEL INVENTORY
CY-1985 SPENT FUEL DATA BASE

STATE / REACTOR OR STORAGE POOL	METRIC TONS THROUGH 1985	METRIC TONS THROUGH 2000	METRIC TONS THROUGH 2010	METRIC TONS THROUGH 2020	METRIC TONS STORAGE CAPACITY
** STATE VT					
VT VT YANKEE 1	246	439	549	655	530
VT GENERIC BWR REACTOR	0	0	0	106	LIFETIME
** Subtotal **	246	439	549	761	
** STATE WA					
WA WNP-1	0	0	162	398	492
WA WASH NUCLEAR 2	0	361	589	805	471
WA WNP-3	0	148	442	705	574
WA GENERIC BWR REACTOR	0	0	0	74	LIFETIME
WA GENERIC PWR REACTOR	0	0	38	285	LIFETIME
WA GENERIC PWR REACTOR	0	0	0	143	LIFETIME
** Subtotal **	0	510	1231	2409	
** STATE WI					
WI LACROSSE	27	53	73	73	58
WI POINT BEACH 1	160	314	406	449	560
WI POINT BEACH 2	153	305	396	457	0
WI KEWAUNEE	138	320	433	523	369
WI GENERIC BWR REACTOR	0	0	0	216	LIFETIME
WI GENERIC BWR REACTOR	0	0	0	175	LIFETIME
WI GENERIC PWR REACTOR	0	0	0	106	LIFETIME
WI GENERIC PWR REACTOR	0	0	0	74	LIFETIME
** Subtotal **	478	992	1308	2073	
*** Total ***	12650	41919	66917	106312	

Table E2. Projections of Total U.S. Spent Fuel Discharges (Thousand Metric Tons of Initial Heavy Metal)

Year	No New Orders Case	Lower Reference Case	Upper Reference Case	Optimistic Case	Sensitivities		
					Upper Reference Case		No New Orders Case, No Increased Burnup
					No Increased Burnup	Continued Higher Burnup	
1985[1]	12.4	12.4	12.4	12.4	12.4	12.4	12.4
1986	13.8	13.8	13.8	13.8	13.8	13.8	13.8
1987	15.3	15.3	15.3	15.3	15.4	15.3	15.3
1988	17.0	17.0	17.1	17.1	17.2	17.1	17.0
1989	18.9	18.9	19.2	19.2	19.3	19.2	18.9
1990	20.9	20.9	21.2	21.3	21.5	21.2	20.9
1991	23.0	23.0	23.2	23.4	23.7	23.2	23.0
1992	25.1	25.1	25.4	25.6	26.0	25.4	25.2
1993	27.2	27.2	27.4	27.7	28.2	27.4	27.3
1994	29.2	29.2	29.4	29.7	30.4	29.4	29.4
1995	31.2	31.2	31.5	31.8	32.6	31.5	31.7
1996	33.2	33.2	33.5	33.9	35.3	33.5	33.9
1997	35.0	35.0	35.5	35.9	37.7	35.5	36.0
1998	36.9	36.9	37.5	38.0	40.2	37.5	38.3
1999	38.9	38.9	39.5	40.0	42.7	39.5	40.6
2000	40.8	40.8	41.6	42.0	45.2	41.6	42.8
2001	42.7	42.7	43.6	44.1	47.7	43.2	45.1
2002	44.6	44.6	45.6	46.2	50.2	44.7	47.4
2003	46.6	46.6	47.8	48.5	52.9	46.4	49.7
2004	48.6	48.6	50.1	51.1	55.7	48.3	52.0
2005	50.5	50.5	52.4	53.7	58.5	50.2	54.3
2006	52.5	52.5	55.0	56.7	61.6	52.3	56.6
2007	54.6	54.6	57.7	60.2	65.0	54.7	59.0
2008	56.5	56.5	60.3	63.5	68.4	57.2	61.4
2009	58.6	58.7	63.4	67.4	72.0	60.0	63.9
2010	60.9	61.1	66.6	71.8	75.9	63.0	66.5
2011	63.1	63.4	69.9	76.1	80.0	66.1	69.1
2012	65.3	65.9	73.5	80.9	84.4	69.3	71.7
2013	67.6	68.5	77.2	86.3	88.9	72.8	74.4
2014	70.2	71.5	81.4	91.9	93.7	76.6	77.3
2015	72.3	74.3	85.6	97.7	98.6	80.3	79.7
2016	74.0	76.8	89.6	103.9	103.5	83.7	81.7
2017	75.7	79.5	93.7	110.3	108.3	87.3	83.6
2018	77.0	81.8	97.8	116.6	113.0	90.7	85.1
2019	78.1	84.1	101.8	123.0	118.1	94.2	86.5
2020	79.3	86.8	106.0	130.3	123.4	97.8	87.8

[1] Preliminary data collected on Form RW-859, "Nuclear Fuel Data," indicate that 12.4 thousand metric tons of initial heavy metal have been discharged through 1985.

Source: Projections derived from the International Nuclear Model.

QUESTIONS FROM SENATOR JOHNSTON

QUESTION 24e: Does DOE believe that the Nuclear Waste Policy Act of 1982 authorizes the Department to take title to spent nuclear fuel after January 31, 1998, even though a repository is not operating?

ANSWER: DOE's obligation to accept waste is stated as follows in section 302(a)(5) of the NWPA:

"Contracts entered into under this section shall provide that -

(A) following commencement of operation of a repository, the Secretary shall take title to the high-level radioactive waste or spent nuclear fuel involved as expeditiously as practicable upon the request of the generator or owner of such waste or spent fuel; and (B) in return for the payment of fees established by this section, the Secretary, beginning not later than January 31, 1998, will dispose of the high-level radioactive waste or spent fuel involved as provided in this subtitle."

The Disposal Contract, developed through the public rulemaking process, represents DOE's view of the NWPA. As detailed in Article II, the contract provides for DOE's acquisition of title to the spent nuclear fuel and high-level radioactive waste, transportation, and subsequent disposal "after commencement of facility operations, not later than January 31, 1998."

Article I,10 of the Disposal Contract defines the term "DOE facility" as "a facility operated by or on behalf of DOE for the purpose of disposing of spent nuclear fuel and/or high-level radioactive waste, or such other facility(ies) to which spent nuclear fuel and/or high level radioactive

ANSWER 24e: (Cont'd)

waste may be shipped by DOE prior to its transportation to a disposal facility." (emphasis added)* Therefore, DOE believes that acceptance of title and shipment of spent nuclear fuel and/or high-level radioactive waste to an MRS, if authorized by the Congress, would constitute an acceptable DOE facility under the Disposal Contract and allow DOE to meet its contractual obligation even though a repository is not operating.

QUESTIONS FROM SENATOR JOHNSTON

QUESTION 24(f1): Would DOE be authorized to take title to fuel and store it at the reactor site?

-- When could this be done?

-- Who would pay for the storage casks?

-- What would be the implications for the licensee for the reactor?

ANSWER: The NWPA does not address the question of DOE taking title to fuel and storing it at the reactor site.

DOE's only authority under the NWPA in terms of storage is defined in Section 131 as follows:

(1) the persons owning and operating civilian nuclear power reactors have the primary responsibility for providing interim storage of spent nuclear fuel from such reactors, by maximizing, to the extent practical, the effective use of existing storage facilities at the site of each civilian nuclear power reactor, and by adding new onsite storage capacity in a timely manner where practical;

(2) the Federal Government has the responsibility to encourage and expedite the effective use of existing storage facilities

ANSWER 24(f1) CON'T

and the addition of needed new storage capacity at the site of each civilian nuclear power reactor; and

(3) the Federal Government has the responsibility to provide, in accordance with the provisions of this subtitle, not more than 1,900 metric tons of capacity for interim storage of spent nuclear fuel for civilian nuclear power reactors that cannot reasonably provide adequate storage capacity at the sites of such reactors when needed to assure the continued, orderly operation of such reactors.

QUESTIONS FROM SENATOR JOHNSTON

QUESTION 24(f2): To what extent is DOE legally obligated to take title to spent fuel after January 31, 1998?

-- How would this obligation be enforced?

ANSWER: DOE's legal obligation is as identified in the response to 24(e) above. DOE is seeking to develop the necessary facilities to meet the intent of the Act and the terms of the contract.

Enforcement, per se, should not be necessary since DOE is committed to take title to spent fuel as expeditiously as practicable upon request of the generator and within the terms specified in the contract.

QUESTIONS FROM SENATOR JOHNSTON

QUESTION 24(g): What is the Department's exposure for failure to accept fuel by January 31, 1998, under the contracts that have been executed with the generators of spent fuel?

ANSWER: The disposal contracts explicitly cover delay situations under Article IX. Under this section of the contract, avoidable delays (within the "reasonable control" of DOE or utility) allow for an equitable adjustment of charges and schedules to reflect additional costs incurred, while unavoidable delays ("beyond the control and without fault or negligence" of DOE or utility) result in no liability and requires only a readjustment to schedules to accommodate delay.

QUESTIONS FROM SENATOR JOHNSTON

QUESTION 24(h): Is DOE authorized to provide financial support for storage at a utility site of utility-owned spent nuclear fuel under the Nuclear Waste Policy Act? Cite the relevant provisions of the Act.

ANSWER: There are no provisions authorizing financial support to utilities for storing spent nuclear fuel under the Nuclear Waste Policy Act.

QUESTIONS FROM SENATOR JOHNSTON

QUESTION 25a: Approximately a year ago, DOE awarded a $70-million contract to Roy F. Weston Inc. for technical support and overall management of the Waste Program. A protest of the contract award was subsequently upheld by the General Accounting Office, and DOE is in the process of renegotiating the contract with both Weston and NUS Corp.

-- What is the status of contract negotiations with the two companies?

ANSWER: Revised offers were received from NUS Corporation and Roy F. Weston, Inc., on December 29, 1986. The Defense Contract Audit Agency has audited all prime and subcontractor cost proposals. The Source Evaluation Board has completed its initial evaluations and will shortly begin oral discussions with both offerors. Negotiations will follow shortly thereafter and will be concluded with the receipt of best and final offers and signed definitized contracts. Selection consideration will be based on the best and final offers received, along with the signed definitized contracts.

QUESTION 25b: When does DOE expect to have a new contract in place?

ANSWER: Prior to, but not later than, July 30, 1987.

QUESTION 25c: Why have contract negotiations taken so long?

ANSWER: The pace of contract negotiations has been delayed by protests to the General Accounting Office (GAO) and the Department of Energy (DOE), as outlined in the following chronology of events:

- Jan. 29, 1986: Source Selection Official (SSO) selected Roy F. Weston, Inc.
- Feb. 12, 1986: NUS Corp. protested to GAO
- March 27, 1986: DOE report to GAO in response to NUS protest.
- April 18, 1986: Weston commented on DOE report to GAO
- June 20, 1986: GAO decision sustained the NUS protest
- July 1, 1986: Weston requested reconsideration of GAO's decision
- July 14, 1986: NUS commented on Weston's request to GAO
- Sept. 19, 1986: GAO affirmed its June 20 decision
- Oct. 8, 1986: Weston requested a debriefing from DOE Contracting Officer (C.O.)
- Oct. 30, 1986: C.O. denied Weston's request for a debriefing
- Nov. 3, 1986: Weston requested reconsideration from the C.O. and DOE

QUESTION 25c. (Cont'd)

- o Nov. 14, 1986: C.O. denied Weston's request for reconsideration and accepted Weston's request as an Agency protest
- o Dec. 3, 1986: C.O. submitted report for Agency consideration
- o Jan. 2, 1987: DOE Agency denial issued for Weston protest.

The above actions delayed receipt of revised proposals from R. F. Weston, Inc., and NUS Corporation. As a result, the following amendments to the RFP were issued:

A002 - (Nov. 6, 1986) revised requirements for direct productive manhours and required that revised proposals be received by Dec. 8, 1986

A003 - (Dec. 4, 1986) extended the date for proposal submission to Dec. 22, 1986

A004 - (Dec. 18, 1986) extended the date for proposal submission to Dec. 29, 1986.

Revised proposals were received from NUS Corp. and Roy F. Weston, Inc., on December 29, 1986. The SEB opened and recorded receipt of both proposals on January 6, 1987.

QUESTION 25d: Weston has held the technical support contract since 1983.

-- Describe the scope of Weston's work.

ANSWER: Weston provides technical support to OCRWM under a level of effort, task assignment type, contract. The technical support services are designed to assist OCRWM in carrying out its mission pursuant to the NWPA in seven general areas: Program Analysis and Systems Engineering, Engineering Economics, Regulatory Interactions, Geologic Repository Deployment, Institutional/External Activities, Technical Management, and Miscellaneous Support.

QUESTION 25e: How has the scope of the work changed over the past three years?

ANSWER: The basic scope of the contract has not changed over the last three years. Tasking and expenditure of effort under the contract have been driven by the Office of Civilian Radioactive Waste Management's need to respond to the mandates and milestones contained in the NWPA. Since the contract was negotiated prior to passage of the NWPA, this proved to be a more labor-intensive undertaking than originally anticipated. Therefore, the contractor was tasked to expend direct productive manhours at a faster pace. As a

ANSWER 25e: (Cont'd)

result, what was intended as a 5-year contract was used up in 3 1/4 years, i.e., March 18, 1983 - June 20, 1986.

QUESTION 25f: How much of the work carried out by field office contractors is coordinated by headquarters and/or Weston?

ANSWER 25f: OCRWM Headquarters staff and Weston currently do not directly coordinate the work of project office contractors; this is the responsibility of appropriate OCRWM project offices within DOE Operations Offices. OCRWM provides technical oversight and policy guidance to the project offices. It is supported in its technical review function by Weston.

QUESTION 25g: About what percentage of the work done by Headquarters is carried out by Weston?

ANSWER: In its role as technical support contractor, Weston provides assistance, advice and recommendations to OCRWM in the general technical areas outlined in response to Question 25d above. OCRWM, in turn, performs those functions which are reserved for the Federal Government and include, but are not limited to, the use of discretionary judgment, the setting of policy, and the approval of work delivered under contract to OCRWM.

ANSWER 25g: (Cont'd)

In FY 1986, Weston expended approximately 300,000 direct productive manhours in support of OCRWM. During the same period, OCRWM Headquarters employees expended approximately 286,000 hours (137 full-time equivalents).

QUESTION 25h: DOE has extended the Weston contract for three-month intervals since June 1986 when the GAO found the Department's contract selection process flawed.

-- Has DOE's program suffered because of this stop-gap method?

-- What problems have been caused by the lack of a permanent contractor in place?

ANSWER: Weston is currently authorized to expend not more than 25,000 direct productive manhours (DPMH) monthly (300,000 DPMH annually), in support of OCRWM. The successor contract will be based on an expenditure rate that is approximately 10 percent higher and more realistic in terms of current program requirements. The difference, approximately 16 staff year equivalents, has resulted in some work being deferred. However, the impacts to date have been tolerable on a short-term basis. Because of the uncertainty surrounding award of the successor contract, Weston has also experienced some difficulty in filling vacancies

ANSWER 25h: (Cont'd)

resulting from staff attrition. Overall, the impact on the program thus far has not been significant.

QUESTIONS FROM SENATOR JOHNSTON

QUESTION 26: The lack of centralized control over field project offices in carrying out the waste program has been cited by the General Accounting Office and others as having a detrimental effect on DOE's ability to manage the program.

--Describe your plans to put a single contractor in place to manage the overall system and integrate work done by the field offices and contractors.

--How long would it take to reorganize and put such a contract in place?

ANSWER: The Department recognized that the waste program must pursue a new approach that improves overall program direction and control in order to assure meeting Nuclear Waste Policy Act requirements and timing. A joint Headquarters/field working group developed several management options which were submitted to the Director of the Office of Civilian Radioactive Waste Management. On February 5, 1987, the Secretary approved the option as recommended by the Director.

Under this option, Headquarters will assume direct management responsibility for the implementation of major program elements, using an integrated contractor to accomplish the systems engineering and development (SE&D) work for the technical management and integration of the nuclear waste management system.

On February 13, 1987, and April 1, 1987, notices were published in the Commerce Business Daily announcing the intent to issue a Request for Proposals (RFP) for the SE&D work. The RFP is currently being prepared at DOE Headquarters.

It is estimated that the contract will be awarded within one year, with a one-year phase-in period after award to allow for an orderly transition of responsibilities.

QUESTIONS FROM SENATOR JOHNSTON

QUESTION 27: a. Why did DOE publish its cost allocation proposal as a Notice of Inquiry instead of a formal rulemaking, as was used when DOE developed its standard contract with utilities for payments to the waste fund?

--In the interest of equity between the civilian and defense sectors in establishing a payment process, would it not be more appropriate to use a formal rulemaking?

b. What process does DOE intend to follow in evaluating comments received in response to its notice of inquiry?

c. When will DOE finalize the defense payment mechanism?

d. Once a defense payment mechanism is finalized, will DOE's Office of Defense Programs have a legally binding contract requiring payments to the waste fund on a set schedule as the utilities do?

--If not, why not?

e. Will defense payments to the waste fund be subject to annual appropriations by Congress?

f. DOE has not requested money in its fiscal year 1988 budget for defense payments to the waste fund.

--Why not?

--Will DOE submit a budget amendment to Congress to accommodate these payments once the mechanism is finalized?

--If not, why not?

--When does DOE anticipate defense payments to the waste fund will begin?

g. What will be the timing of defense payments to the waste fund?

--Will there be a payment made for defense waste generated prior to April 7, 1983, similar to the so-called one-time fee paid by utilities?

QUESTION 27: (Cont'd)

--Will the defense payments be paid as the waste is generated, as is the case with ongoing fee paid by utilities.

h. Any utilities that did not pay their one-time payment in full by June 30, 1985, will pay interest on the remainder of this payment.

--Does DOE plan a similar process for defense payments? If not, why not?

i. DOE's estimate of the amount of commercial spent fuel to be disposed of in a repository is based on the Energy Information Administration's Mid-Case projection of 130,000 metric tons of uranium in 2020. This is considered a high estimate. On the other hand, the estimate of defense waste used by DOE to calculate the defense share of costs is 16,000 canisters (about 8,000 MTU) of defense waste, which is considered a low estimate.

--By using a high estimate for spent fuel generation and a low estimate for defense waste, doesn't this result in a skewed allocation of costs between the civilian and defense sector?

j. DOE's Mission Plan of June 1985 estimates that 20,000 canisters of defense waste will be solidified for disposal by 2020.

--Why hasn't this estimate been used instead of 16,000?

--Isn't it true that even the estimate of 20,000 canisters does not include any of the waste that will be generated at the Idaho National Engineering Laboratory?

--Why not?

k. In comments on DOE's Notice of Inquiry, several utilities suggested that the inventory of defense waste already exceeds 16,000 canisters and that 20,000 would be a more appropriate figure.

--How much defense waste is currently in storage?

QUESTION 27: (Cont'd)

--At Hanford?

--At Savannah River?

--At Idaho?

l. Estimates of the amount of canisters that would be required to accommodate the waste in the single-shell tanks at Hanford are as high as 21,500.

--Is this an accurate estimate?

--When will a decision be made on whether to remove the sludge and waste from the single-shell tanks for disposal in a repository?

--Given the potential high volume of waste that might require disposal, why hasn't DOE included this in its assessment of costs?

m. Very few commenters on DOE's Notice of Inquiry endorse the option selected by DOE. The utilities have suggested an alternative approach that would combine two of DOE's options. They suggest use of DOE's preferred option (shared costs based on either the area required for defense waste disposal, the number of defense packages to be disposed, or the number of defense packages to be process) where costs are directly related to the waste handled. But where costs are independent of the type or amount of waste handled, the utilities suggest that costs be divided with utilities paying 2/3 and defense programs paying 1/3.

--Please comment on this suggested alternative.

ANSWER 27a: The purpose of the Notice of Inquiry (NOI) was to solicit public comment on a proposed fee calculation methodology that will lead to the determination of a fee payment methodology for defense high-level waste (DHLW). The fee payments will be subject to Congressional appropriation.

ANSWER 27a: (Cont'd)

The Department cannot establish a rule that binds Congress to appropriate money. A rulemaking procedure was not considered appropriate for the determination of the DHLW fee.

ANSWER 27b: The comments are being reviewed by the Office of Civilian Radioactive Waste Management (OCRWM) and the Office of Defense Programs (DP) and will be used to assist the Department in the final determination of a fee calculation methodology. It is the Department's intention to publish a Notica in the Federal Register identifying the selected methodology, and to include in that Notice responses to the comments that have been submitted.

ANSWER 27c: The Department plans to finalize the fee calculation methodology by the summer of 1987. Subsequently, an agreement between the Offices of Civilian Radioactive Waste Management and Defense Programs will be executed which will include an initial schedule of the amount of funds to be requested annually in the Department's budget.

ANSWER 27d: The payment of DHLW disposal fees will require a Congressional appropriation. The Department cannot legally bind the Congress to make such

ANSWER 27d: (Cont'd)

appropriations. It is anticipated that the Department will request funds each year through the normal budget cycle.

ANSWER 27e: As discussed in d. above, defense payments will be subject to annual appropriations by Congress.

ANSWER 27f: A budget request for payments by DP to OCRWM would be more meaningful after a determination has been made on the methodology to be used to arrive at the total amount due.

In preparation for this, on December 2, 1986, the Department published a notice in the Federal Register that discussed alternative methods for calculating a fee for the disposal of DHLW. The Notice invited public comments through February 2, 1987. These comments will be used in discussions during the next few months that are expected to result in an agreement between OCRWM and DP on a provisional basis for a total fee. It is expected that this basis will be reexamined annually as estimates of the costs of handling DHLW improve.

Once an initial estimate of total defense waste fees has been determined, alternative payment schedules will be examined. When a payment schedule has been determined, the Department will

ANSWER 27f: (Cont'd)

decide whether it is more appropriate to handle the initial request for payments through an amendment to the current budget or to schedule the initial request for payments as a part of the next annual budget cycle.

ANSWER 27g: As mentioned in f. above, once the initial estimate of total defense waste fees has been determined, alternative payment schedules will be examined. The alternatives will consider similarities and differences between the provisions of the Standard Contract and the alternatives for payment of defense waste fees. The ultimate consideration will be that neither the defense nor civilian waste disposers should subsidize the other. Since the DHLW disposal fee is to cover the full costs of DHLW disposal by OCRWM, the fees ultimately paid will cover the costs of pre-1983 wastes. Currently, it has not been determined whether the DHLW fee payments will be paid as the waste is generated, paid as a share of the ongoing costs of the OCRWM program, or paid according to some other schedule.

ANSWER 27h: As noted in the NOI, the total defense waste fee payment is to equal the present discounted value of the cost of DHLW disposal by OCRWM. This means

ANSWER 27h: (Cont'd)

that the costs of delayed payment, in the form of interest, are considered to be an integral part of the cost of defense waste disposal and will be included in the disposal fees paid by DP.

ANSWER 27i: It is true that lower spent fuel projections would increase the defense waste fee, using the methodology as proposed in the NOI. It is also true that there is uncertainty in the spent fuel and defense waste projections.

It should be noted, however, that the quantities of civilian and defense waste used in the NOI were for illustrative purposes only. Ultimately, the total amount of funds paid into the Nuclear Waste Fund for the disposal of defense waste will be determined from the relative quantities of waste actually emplaced.

ANSWER 27j: The estimate of 20,000 canisters has been used in previous studies. However, 16,000 is a more recent estimate, and is the number that has been baselined for OCRWM planning purposes.

The 16,000 canisters is comprised of waste from three defense sites as follows:

ANSWER 27j: (Cont'd)

Site	Canisters
Savannah River	7,000
Hanford	1,500
Idaho	6,000
Future Production	1,500
TOTAL	16,000

ANSWER 27k: No canisters of defense waste have been produced to date. Of the estimated 16,000 canisters of defense waste to be produced, the quantity of existing waste is equivalent to about 6,600 of the 16,000 canisters. The total amount of defense waste that currently exists is equivalent to about 30,700 canisters. This includes estimates of waste at Hanford for which no decision has been made regarding the need for disposal in a repository. The following is a summary of defense waste at the three sites:

Equivalent Canisters of Existing DHLW as of 1986

	OCRWM Planning Estimate	All Existing DHLW
Savannah River	4,900	4,900
Hanford	800	22,800*
Idaho	900**	3,000
TOTAL	6,600	30,700

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*Includes Hanford waste in single-shell tanks and cesium/strontium capsules for which no decision has been made regarding method of disposal.

**Assumes a volume reduction, for removal of inert materials, equivalent to 2,100 canisters.

ANSWER 27k: (Cont'd)

A reference for the data used in Answers j. and k. is Table 4.1 of the document "Perspective on Methods to Calculate a Fee for Disposal of Defense High-Level Waste in Combined (Civilian/Defense) Repositories," DOE/RL-86-10, dated December 1986.

It should also be noted that the 16,000 canisters currently being used in OCRWM planning accounts for over 90 percent of the total radioactivity in the total projected defense waste quantities through the year 2020.

ANSWER 27l: This is the best estimate at this time. The accuracy of the estimate will not be known until, and unless, the single-shell tank wastes are processed for disposal. As noted, the NOI included only DHLW that is virtually certain to be transferred to OCRWM. Environmental assessments need to be made before a decision on final disposal for the single-shell tank wastes can be determined. If it is determined that additional DHLW will be emplaced in the repository, the OCRWM estimates will be revised accordingly.

ANSWER 27m. The use of the 1/3-2/3 sharing of certain fixed costs of the combined OCRWM disposal system, which has been

ANSWER 27m: (Cont'd)

suggested as reflecting a sharing of avoided fixed costs for DHLW and spent nuclear fuel disposal, respectively, is currently under consideration together with all other comments received in response to the NOI. No decision has been made at this time.

QUESTIONS FROM SENATOR McCLURE

QUESTION 1: Is it your intention to proceed with implementation of the nuclear waste program along the lines proposed in the Mission Plan amendment unless Congress fails to take some affirmative action to reject what you have proposed, or would the Congress,in your view, have to take affirmative action to approve the Mission Plan amendments before you could proceed with implementing the changes? In short, what posture are we in if no action is taken by Congress when these amendments are submitted?

ANSWER: The 5-year extension of the date to begin operations of the first repository, and the indefinite postponement of site-specific work for the second repository described in the Draft Mission Plan Amendment are proposals to the Congress of the Department's best estimate of how the program can be carried out. The Department's position is that if Congress does not affirm the plan and implementation schedule described in the Mission Plan Amendment, then the Department will go back and do its utmost to meet the requirements of the Act although it is already clear that some of the schedules would be extremely difficult, if not impossible, to achieve while striving to meet the level of quality required for the program.

QUESTIONS FROM SENATOR McCLURE

QUESTION 2: In a September 5th, 1986, legal analysis prepared by the Department's General Counsel, Mr. Rusche was told that: (a) the Nuclear Waste Policy Act includes "specific requirements to make recommendations regarding the site of the second repository in 1989 and 1990"; (b) "as statutory requirements, they remain intact until repealed, amended or supplanted by new legislation adopted through constitutionally-required procedures of bicameralism and presentment to the President"; and (c) "an amendment (to the Mission Plan), standing alone, would not have the legal effect of altering the provisions of sections 112 and 114 that require particular recommendations by particular times regarding a second repository site." As I understand what your lawyers are saying, the Department is required to proceed with a second repository program, regardless of what is proposed in the Mission Plan, unless Congress amends the Act to eliminate these requirements. Do you disagree with this conclusion and, if not, how do you reconcile your position that you can implement these Mission Plan amendments if Congress does not act affirmatively to reject them with what your lawyers are telling you?

ANSWER: The Department concurs in the positions outlined in the legal analysis prepared by the General Counsel. The Department does not claim any authority unilaterally to change existing law. Nor should the judgments made by the Department and reflected in the draft Mission Plan Amendment be characterized in this fashion.

The schedules set forth in the draft amendments to the Mission Plan were based solely upon programmatic judgments. They were not intended to set forth any particular legal positions, but rather to describe the Department's considered and informed judgments, based on its actual experience in administering these programs, of the course and timing that the first and second repository programs should take given current circumstances. The Department recognizes that carrying out these programs in the way described in the proposed amendments to the Mission Plan will require legislative action to accomplish.

QUESTIONS FROM SENATOR McCLURE

QUESTION 3: You have argued in the past that what the Department is proposing with respect to the second repository is really no different than earlier delays in implementing the program -- and that since Congress was informed and did not reject these earlier delays, that somehow you are justified in now announcing an indefinite postponement of the second repository. Isn't there a significant difference in making a good faith effort to meet the deadlines, but nevertheless missing those deadlines, versus a decision not even to make a good faith effort to meet the deadlines and simply postponing the program? Isn't there an important legal difference between these two situations?

ANSWER: As indicated above, in the draft Mission Plan Amendment, the Department has presented its recommendations on the course and timing for the first and second repository. Further, the Department recognizes that if Congress does not affirm the Department's recommendations, we will go back and try to meet the specific dates and requirements of the Act although some of the schedules are probably unattainable.

QUESTIONS FROM SENATOR McCLURE

QUESTION 4:	As I understand your MRS proposal, you would tie operation of an MRS to issuance by the NRC of a construction authorization for a high-level waste repository. Now that you are proposing to delay the date when NRC issues a construction authorization by four and one-half years, does this suggest that you will also need to rework the MRS proposal and to incorporate these new assumptions with regard to the schedule?
ANSWER:	In the development of the MRS proposal, the one most often cited concern is that an MRS facility would diminish the resolve to develop a geologic repository. To allay such concerns and to reinforce this country's unwavering commitment to the geologic repository program, the DOE planned proposal to Congress links the startup of the MRS facility to the schedule of the repository: no waste may be accepted at the MRS facility until a construction authorization for the first repository is received from the NRC. The Department continues to believe that the operation of the MRS should be tied to the issuance of a construction authorization by the NRC for a repository. Although the date when NRC issues a construction authorization is delayed four and one-half years until the first quarter in 1998, this still allows the MRS to commence operations to meet our contractual obligations. Obviously, any

additional delays in the date a construction authorization is received for the first repository would impact our ability to meet our contractual obligations by accepting spent fuel at the MRS.

QUESTIONS FROM SENATOR McCLURE

QUESTION 5: On page 44 and 45 of your draft Mission Plan Amendment, you point to the final environmental assessments as one factor that gives you confidence that the first repository sites will be suitable and that, accordingly, a second repository can be deferred. Isn't it true that, in fact, the NRC was highly critical of DOE's environmental assessment and specifically noted that "some conclusions in all five final EA's are still overly favorable or optimistic"? How do you reconcile your optimistic view of the EA's with what NRC has said, and do you intend to rework the EA's to address the NRC concerns?

ANSWER: We believe that our own technical experts' estimates of postclosure performance were a reasonable basis for the decision at hand -- selecting sites that appear to justify the investment in characterizing them. DOE's technical experts provided these estimates of postclosure repository performance at the five sites employing reasonably conservative assumptions. Uncertainties were accounted for using recognized, state-of-the-art practices. For example, judgmental probabilities of occurrence of scenarios were generated only after the technical specialists were introduced to the theory of judgmental probability and apprised of the biases that experiments have shown can produce distortions in probability estimates.

It is clear that the level of proof required for licensing will be greater than can currently be demonstrated. However, all five sites appear to exceed regulatory requirements by large margins; accounting for additional uncertainty as suggested by the NRC comments would likely not alter the conclusion that all sites are above the threshold of acceptability. In other words, all sites appear suitable and none appear to be disqualified. Data gathered and analyzed during site characterization will demonstrate the proper values to be applied in evaluating the sites.

DOE does not intend to rework the EAs to address NRC's observations; however, the NRC analyses will be invaluable in developing site investigations plans. To rework the EAs would not be consistent with NRC's stated purpose for providing DOE with the comments in the first place: "for consideration by DOE in the development of the Site Characterization Plans." DOE has held, and will continue to hold, technical meetings with NRC to discuss the treatment of uncertainties and alternative interpretations of data in Site Characterization Plans. Such pre-licensing interactions are an important means to determining a site's suitability for development as a repository.

QUESTIONS FROM SENATOR McCLURE

QUESTION 6: As I understand the rationale behind the various provisions in the Nuclear Waste Policy Act, success of the whole program was assured by providing "backups" in the following ways:

(1) characterization of at least three 1st-repository candidate sites;

(2) proceeding with second repository site selection work on a track approximately 5 years behind the first repository schedule;

(3) submission of an MRS proposal to Congress by June, 1985.

Now, I can certainly understand, in view of the court proceedings, why Congress has not seen an MRS proposal, which explains why monitored retrievable storage, as a third option, is not yet on the table.

But it is clear to me that the Department's indefinite postponement of the second repository work has eliminated, for all practical purposes, the second option I cited.

Which leaves us with all our eggs in the first basket. This would be acceptable from a purely technical standpoint, provided that all goes well during the site characterization process. But this is not acceptable, in many people's view, from the standpoint of the overall balance of the program, as embodied in the Act.

Did you consider any other options prior to final preparation of your Mission Plan amendments? I mean, even your Chief Counsel agrees that whatever you do that is different from the Act requires that Congress amend, repeal, or supplant the original statute. So why not do some real brainstorming, and present us with options that at least might sustain some sense of program balance?

ANSWER: Many options, including contingencies and "backups," have been considered. Some of these contingencies were documented in the June 1985 Mission Plan (Section 2.4). The Department considers that the program described in the draft

Mission Plan Amendment is the best and most balanced way to carry out the program considering where we are now and the experience we have gained thus far. In regard to the first repository program, given the thoroughness of the analyses in the Environmental Assessments, the information base, the results obtained with the decision-aiding methodology, and other considerations, the Department considers that the set of three sites recommended provides the most advantageous combination of characteristics and conditions for the successful development of a repository.

The Department has not eliminated the second repository. The Department intends to continue a program for, and remains committed to, a second repository, with studies that will focus on generic technical issues. The Department believes that site-specific work should be reconsidered in the mid-1990's which would allow ample time to implement a second repository program prior to the first repository achieving its 70,000 metric ton capacity. However, we have testified that we will go back and pursue site-specific work if Congress does not affirm the Department's proposal in the draft Mission Plan Amendment.

Finally, the Department has, on March 31, 1987, submitted the Monitored Retrievable Storage (MRS) proposal to Congress required by Section 141 of the NWPA. An MRS could be operational to receive spent fuel by 1998.

QUESTIONS FROM SENATOR McCLURE

QUESTION 7: I agree with you that a healthy relationship between DOE and the affected States and Indian Tribes is paramount to the program's overall success:

(a) What are you doing to initiate C&C negotiations with Texas and Nevada?

(b) What are you doing to bring C&C negotiations with Washington State to a close?

(c) You mention in the Mission Plan amendments that a waste disposal facility "may lead to special socioeconomic burdens that were not contemplated when the Act was passed." Could you elaborate on these "burdens", and what could be done to alleviate these "burdens"?

ANSWER 7(a): On May 28, 1986, President Reagan approved the Department's recommendation that sites in three states - Nevada, Texas, and Washington - be selected for site characterization. On July 25, 1986, Mr. Jefferson O. Neff, Manager of the Salt Repository Project Office, wrote to Mr. Steve Frishman, Director of the Texas Nuclear Waste Programs Office, to invite the State of Texas to participate in a joint meeting with representatives of all states within which recommended sites are located and all three affected Indian Tribes for the purpose of developing a Consultation and Cooperation Agreement. Mr. Frishman replied in a telephone conversation with DOE Headquarters staff on August 19, 1986, that a joint meeting between the Department and State and Tribal nuclear waste offices would not be appropriate at that time, although such a meeting might be worthwhile in the future and felt that individual State negotiations should take place first.

In response to this interest in individual negotiations, a letter was sent to Governor Mark White of Texas on November 20, 1986, to renew the Department's offer to negotiate a Consultation and Cooperation Agreement, this time directly between DOE and the State of Texas. Steve Frishman responded to this letter on December 5, 1986, by acknowledging DOE's designation of a team to initiate negotiations with Texas.

On July 25, 1986, Mr. Donald Vieth, Director of the Waste Management Project Office at DOE's Nevada Operations Office, wrote to Mr. Robert Loux, Executive Director of the Nevada Nuclear Waste Project Office, to invite the State of Nevada to the joint C&C meeting described above. Mr. Loux replied in a telephone conversation with DOE Headquarters staff on August 19, 1986, that he did not see the need for a joint meeting at this time. In a letter dated August 27, 1986, to Mr. Vieth, Mr. Loux reiterated this, and also indicated that the State of Nevada would likely be in a position to initiate direct negotiations with the Department in the near future.

In response to this interest in individual negotiations, a letter was sent to Governor Richard Bryan of Nevada on November 19, 1986, to renew the Department's offer to negotiate a Consultation and Cooperation Agreement, this time directly between DOE and the State of Nevada. On December 16, 1986, Governor Bryan replied, charging that the implementation of the Nuclear Waste Policy Act by the Department of Energy has made it "impossible for the State of Nevada to have any confidence or trust in any negotiations with the Department of Energy regarding the implementation of the balance of the program..." On January 19, 1987, Governor Bryan wrote another letter to the Department of Energy indicating the reason for his statements made in the letter of December 6, 1986, and declining at this time to enter into negotiations for a Consultation and Cooperation Agreement with the Department.

Section 117(c) of the NWPA requires that DOE prepare a report to Congress if a written C&C agreement is not completed within 6 months after DOE seeks to enter an agreement. Prior to submission to Congress, the report must be sent to the State or Indian Tribe for review and comment. These comments must be included in the report before it is sent to Congress. On December 23, 1986, reports were sent to the three States and three Indian Tribes with candidate sites. DOE has received comments from Texas and Nevada on the reports and accompanying comments will be forwarded to Congress shortly.

ANSWER 7(b): On July 27, 1983, the State of Washington initiated consultation and cooperation negotiations with the Department. These negotiations, which were suspended by the State of Washington pending resolution of several issues, were described in a report on the status of negotiations for a Consultation and Cooperation Agreement transmitted to Congress on September 26, 1984.

On May 28, 1986, President Reagan approved the Department's recommendation that sites in three states - Nevada, Texas, and Washington - be selected for site characterization. On July 25, 1986, Mr. Lee Olson, Director of the Basalt Waste Isolation Division at DOE's Richland Operations Office wrote to Mr. Terry Husseman, Program Director, Washington Office of High-Level Nuclear

Waste Management, to invite the State to renew the process of developing a Consultation and Cooperation Agreement with a meeting of representatives of all States within which recommended sites are located and all three affected Indian Tribes. Mr. Husseman replied in a telephone conversation with DOE Headquarters staff on August 19, 1986, that the State did not see the need for the consultation and cooperation process to be a joint effort, and that the State of Washington wanted only direct negotiations with DOE. The State of Washington requested an informal meeting to discuss negotiation procedures in a letter sent to Michael Lawrence, Richland Operations Office, on August 25, 1986. Such a meeting was held between DOE and the State on October 9, 1986.

In response to the State's interest in individual negotiations, a letter was sent to Governor Booth Gardner of Washington on November 19, 1986, to renew the Department's offer to negotiate a Consultation and Cooperation Agreement, this time directly between DOE and the State of Washington. On December 18, 1986, the Governor and the Director of the Office of Civilian Radioactive Waste Management met and among the topics discussed were Consultation and Cooperation. The Governor indicated a reluctance to participate in Consultation and Cooperation negotiations unless certain conditions were met. He indicated that he would make a more specific proposal shortly.

On December 30, 1986, Governor Gardner sent a proposal to Secretary Herrington of the Department of Energy, regarding a conflict resolution process that he felt would aid in consensus building and a mid-course correction and enable key stakeholders to be brought together. This proposal is currently being reviewed by DOE management.

On January 27, 1987, Governor Gardner sent a letter to the Department commenting on its report to Congress, and noting again that the conflict resolution process is a good mid-course correction action for the program.

The Department of Energy is looking forward to working with the states of Nevada, Texas, and Washington, as well as with the affected Indian Tribes, to negotiate a C&C agreement.

ANSWER 7(c): The Department and the nuclear utilities safely operate nuclear facilities that handle spent fuel and high-level nuclear waste throughout the country and there is excellent reason for confidence that the solid high-level waste and spent fuel can be safely disposed of in deep underground solid-rock repositories. At the same time, however, the facilities associated with the management of nuclear wastes under the Nuclear Waste Policy Act are perceived as hazardous and controversial. Regardless of its validity, this perception creates a burden in the eyes of the potential host communities and States. It is seen as a potential stigma that, if it continues for the duration of the program, could impact the ability of these areas to recruit new business or to retain existing commerce.

The draft Mission Plan Amendment suggests that Congress may wish to consider making assistance available to affected States and Indian Tribes on a broader basis than just the impact mitigation required by the Act. In doing so, Congress may help the waste management facilities to be perceived as being of net benefit.

QUESTIONS FROM SENATOR WEICKER

QUESTION 8: In your proposed Mission Plan Amendments, will any work continue into the handling and transportation of high level nuclear wastes to repository sites?

ANSWER: There are no provisions in the draft Mission Plan Amendment that will significantly impact the level or schedule of work related to the handling and transportation of high-level waste. The event driving the timing for the development of the transportation system is the operation of the Monitored Retrievable Storage (MRS) Facility. The Department submitted the MRS proposal to Congress on March 31, 1987. If approved during FY87, the facility can be constructed on a schedule that will allow the initial acceptance of utility spent fuel in 1998. To support that intent, the transportation system must be operational at the time of fuel acceptance.

QUESTIONS FROM SENATOR WEICKER

QUESTION 9:	**Will safety and transportation procedures developed in the establishment and operation of the first repository be used as a precedent in procedures developed for the second repository?**
ANSWER:	The safety and transportation procedures that are developed and implemented in the establishment and operation of the first repository will provide a precedent for the procedures used in the second repository. It is expected that changes would occur only to accommodate any requirements of location or to incorporate any "lessons learned" from the experience available from the first repository or from other safety and transportation technology developments.

QUESTIONS FROM SENATOR WEICKER

QUESTION 10: What new technologies will need to be developed for construction of the proposed MRS?

ANSWER: The proposed MRS is basically a hot cell complex, involving remote spent fuel handling techniques developed by the Department's contractors and the domestic and foreign nuclear industry over the years.

Therefore, the creation of new technology for the construction and operation of the MRS is unnecessary. However, the application of the existing technology to the MRS to accomplish the packaging of the volume of spent fuel planned for the MRS will require additional engineering demonstration. In particular, the disassembly and consolidation of spent fuel has not been performed on a production line as may be desired for an MRS or a geologic repository packaging facility. In 1986, the Department instituted a competitive program inviting private industry to develop such equipment for demonstration by the Government at its Idaho facilities.

QUESTION FROM SENATOR WALLOP

QUESTION 11: Mr. Secretary, my question does not relate directly to the issue of high level nuclear waste, but rather to remedial cleanup of existing uranium mill tailings. For more than three years, the State of Wyoming has been trying to reach an agreement with the Department of Energy regarding cleanup of the Susquehanna mill tailings pile at Riverton, Wyoming. The State has proposed what appears to be the only sensible solution, to move the tailings to a stabilized site. On January 9, the Wyoming congressional delegation wrote to you asking that a decision be made promptly on the proposed removal. We had requested a response by January 31. Though you have two more days to respond, could you provide us with an answer now on the proposal by the State of Wyoming?

ANSWER: The Department is anxious to reach agreement with the State so that remedial action on this high-priority site near Riverton can proceed expeditiously. The Department is willing to consolidate the mill tailings from the Susquehanna site, subject to the resolution of several issues unique to this situation. We are committed to working with the State to promptly resolve these issues and rapidly move forward with remedial action.

QUESTIONS FROM SENATOR HECHT

QUESTION 1: DOE intends, at least for the high-level waste repository, to obtain NRC certification of its transport casks. Isn't it true that DOE has never before been able to obtain NRC certification of a cask for the transport of spent fuel although DOE has submitted 11 applications to NRC?

(a) Is there any reason why DOE should not be required to obtain NRC certification for all of its spent fuel casks?

(b) If we require private licensees to meet NRC standards before actually making shipments in their casks, why shouldn't DOE contractors be subject to the same requirements?

(c) Are DOE's technical employees of the opinion that the NRC certification standards are overly protective of safety?

(d) Are DOE's technical employees of the opinion that the NRC certification standards do not measure a cask's ability to withstand the accident stresses which those standards are designed to measure?

(e) Will there be anything about DOE's shipping campaign to the repository that will be different from shipping campaigns conducted by NRC licensees such that safety will be ensured in some way other than DOE's casks meeting the NRC standards?

(f) Hasn't DOE designed a shipping container for shipping transuranic waste to the Idaho National Energy Laboratory and the Waste Isolation Project in New Mexico called TRUPACT I which cannot meet certification standards equivalent to NRC's as required by DOT's regulations?

(g) Based on DOE's track record with past applications to NRC for certification of spent fuel casks and its plans to use a shipping container for transuranic waste which cannot meet NRC certification, what assurance can DOE offer that NRC will find the next generation of spent fuel casks to be acceptable, absent Congressionally mandated changes in current laws and regulations?

ANSWER 1: Although DOE may certify its own packages, there are a variety of DOE packages having NRC certificates. There are at least three spent fuel casks now in service with both DOE and NRC certificates.

(a) DOE certification authority is derived from the Atomic Energy Act and DOT regulations (49 CFR 173). The DOE standard for Type B packages is the NRC regulation (10 CFR 71). DOE applies the same rigorous standards of review to its packaging safety analysis reports as does the NRC. There is, then, no reason to require NRC certification for all spent fuel casks.

(b) DOE and its contractors apply the same high standards of NRC's 10 CFR 71.

(c) DOE technical employees hold the NRC review process in high regard. Like most professions, scientists and engineers can disagree on approach. However, our goals are identical--protection of the public health and safety.

(d) DOE believes the NRC certification standards indeed provide a high degree of protection for radioactive materials.

(e) The OCRWM will comply with the applicable safety and security requirements of the NRC and DOT when shipping commercial and defense nuclear waste to NWPA facilities. Safety and security shipping regulations of the NRC and DOT currently include requirements for cask design and testing, physical protection of shipments from acts of theft and sabotage, shipment prenotification, driver training, shipment-identification procedures, and highway-routing procedures. In developing the NWPA transportation system, the OCRWM will evaluate innovative methods for achieving regulatory compliance and safety objectives. For example, the DOE is currently evaluating the use of real-time satellite tracking of shipments. If operation of the system proves successful, the OCRWM will review its application to NWPA shipments in cooperation with States, Indian Tribes, and local governments.

To direct actual NWPA shipments, safety and security procedures for NWPA shipments will be specified in an operations procedure manual. The manual will serve as a management guide and control system for the OCRWM and contractor management. To further promote the safety of NWPA transportation activities, the OCRWM is developing a quality assurance plan; the plan will describe quality assurance responsibilities, authorities and management organization and requirements.

(f) DOE has designed, fabricated and tested TRUPACT I to transport contact handled transuranic waste generated in support of DOE's defense activities. Upon completion of certification, TRUPACT-I could be used to make shipments to the Waste Isolation Pilot Plant from 12 sites nationwide with 80 percent of the shipments originating at the Idaho National Engineering Laboratory in Idaho, the Rocky Flats Plant in Colorado, and the Hanford Reservation in Washington.

In anticipation of the needs of the Waste Isolation Pilot Plant (WIPP), development of the TRUPACT-I system was initiated in 1978 under the technical direction of Sandia National Laboratories with the intent of designing an entirely new packaging for the express purpose of safely transporting transuranic wastes to the WIPP. These contact handled (CH) transuranic wastes (TRU) are nonradioactive items contaminated with alph-emitting transuranium radionucles with half-lives greater than 20 years and concentrations greater than 100 nCi/g of waste. These every-day items used at DOE facilities include rags, rubber gloves, shoe covers, cloth lab coats, plastic bags, and discarded laboratory glass and metalware that are placed in metal Type A packagings and then loaded into Type B packagings, TRUPACT-I. This development process has spanned at least two major revisions of the transportation regulations and several modifications to the program goals and objectives and has produced a safe, thoroughly tested Type B packaging. A combination of design features and waste packaging requirements provides equivalent (if not greater) safety to current NRC and DOE regulatory requirements for containment of radioactivity during normal and accident conditions.

A prototype TRUPACT-I was subjected to 10 CFR 71 regulatory accident tests to show that this 50,000 pound Type B packaging meets these containment criterion for radioactivity and other packaging performance criteria. The criterion assures that only 0.002 curie of plutonium 239 can be released to the environment during a one-week period following an accident even though up to 2000 curies of Pu239 may be present in the containment liner of TRUPACT-I.

TRUPACT-I has two features which do not meet regulations enacted after development work started. These are incorporating a filtered pressure equalization system (filtered vent) and providing a single containment boundary. DOE has now petitoned the Department of Transportation for a rulemaking which would permit both of these features to be used in TRUPACT-I.

DOE has also started development of a package which eliminates these features (TRUPACT-II). This development is now in the design phase.

(g) Spent fuel shipments to a high-level waste repository or monitored retrievable storage facility will be in NRC-certified containers.

QUESTIONS FROM SENATOR HECHT

QUESTION 2: Many of DOE's depictions of the future generation of casks which will service the repository show that the spent fuel will be shielded with depleted uranium. Are there any factories of which DOE is aware that can manufacture depleted uranium shielding since National Lead Industries converted its plant?

(a) If yes, have the owners or operators of those factories had any experience in manufacturing shipping containers or casks for the transport of nuclear wastes?

(b) If yes, of high level nuclear waste, spent nuclear fuel or transuranic waste?

(c) If no such factories exist, has DOE nonetheless received proposals to build casks that will use depleted uranium shielding?

(d) If yes, what, if any, experience have those who submitted proposals had in manufacturing shielding for high level nuclear waste or spent fuel?

ANSWER: Yes, the Albuquerque Operation Office, funded EA&T, Santa Monica, CA, under Contract DE-AC04-84AL27864 Mod A001 to perform an international private industry survey of depleted uranium (DU) vendors. The capebility of the vendors to cast and machine a full-scale 0.2 Mo DU shield liner for the Defense High Level Waste (DHLW) cask was assessed. (The full-scale cask requires four cylinders with 1.63" wall thickness, 30" length, and 30" outside diameter. Each cylinder weighs about 3,000 lb; therefore the total cylinder weight (four) for the cask is about 12,000 lb.) Four private industry manufacturers were identified. A brief description of their experience follows:

1. Eldorado, Port Hope, Ontario, produces castings for radiation shielding and other applications. They have capabilities for full-scale DHLW shield liners.

2. Aerojet Heavy Metals Co., Jonesborough, TN, is a major supplier of small DU products for the U.S. Army. Their existing furnace capabilities are insufficient for the full-scale DHLW cask.

3. Manufacturing Sciences Corp., Oak Ridge, TN, produces thin DU plates. They state these plates can be rolled into four cylinders of the required thickness.

4. Nuclear Metals, Concord, MA, is a major supplier of DU sinker bars for oil logging and DU penetrators for the military. They state their facility has the required capabilities.

   Additionally, the Y12 Plant at Oak Ridge, TN, has the ability to cast DU.

(a) Yes.

(b) Yes to high level nuclear waste and spent nuclear fuel. (The DHLW cask is no longer being considered for remote handled transuranic waste.)

(c) Capabilities do exist (1, 3, 4, and Y12, as mentioned above). The RFP process is not complete and, therefore, not public. Comment cannot be made on proposals received.

(d) Eldorado has extensive experience in fabricating shielding for Ontario Hydro nuclear reactors. The DU shielding for the IF-300 and the closure for the Fort St. Vrain spent fuel casks were supplied by Eldorado. Eldorado fabricated the DHLW half-scale model shield liner used for hypothetical accident testing -- x-radiography examination showed no changes in the DU following five 30-foot (9-m) drop and two puncture tests.

QUESTIONS FROM SENATOR HECHT

QUESTION 3: In the Transportation Appendix to the five Final Environmental Assessments, DOE claims that the inclusion of human error in the risk assessment calculation made an insignificant difference in their outcome. What is the basis for that assertion?

(a) Did DOE assume that any single human error would affect only a single shipment?

(b) If yes, how did DOE justify the noninclusion of cask design or manufacturing errors which might affect all shipments made with a single cask or all shipments made with casks of a particular design?

(c) Looking at the past history of casks, wouldn't it be fair to say that there have been errors made in the tests by which the casks are judged?

(d) [If the answer is other than an unqualified yes], isn't it true that engineers at Lawrence Livermore Labs have described the original computer model puncture test as "crude and unreliable?"

(e) Looking at the past history of casks, wouldn't it be fair to say that there have been errors made in the design of casks?

(f) [If the answer is other than an unqualified yes]

(1) What about DOE's MH-1A truck casks where NRC initially refused certification because the casks were without sufficient shielding against fire despite the fact that DOE and the Army, the casks' previous owner, had used the casks intermittently for eight years? After DOE added shielding and removed several valves, didn't NRC continue to question the ability of the casks to survive a puncture test? After DOT ordered DOE to suspend usage of the MH-IA, didn't DOE's own engineers determine that the casks would lose their package seals around the cask lid in an accident?

(2) What about the IF-300 rail casks where later engineers uncovered a mathematical error in the structural analysis of the BWR fuel basket which, when corrected indicated that the cask would sustain damage in a 30' drop? Isn't it also true that users of the IF-300 casks determined after the casks had been in use for some time that the pressure relief valves were not resealing and appeared to have been replaced in the early 1970's with equally defective valves?

(g) Isn't it true that the past practices intended to ensure quality control in the manufacture of casks have been inadequate?

(h) [If the answer to g is other than an unqualified yes],

(1) What about discovery after testing of 67 ton rail cask that manufacturers had mis-welded shielding and had failed to drill holes into a cavity which would have allowed melted lead shielding to expand without breaching cask?

(2) What about discovery by purchaser of NAC-1 casks five years after they had been produced, that manufacturer had tried to remedy lead shielding imperfections by welding copper plates to the thin spots?

(i) Isn't it true that past practices intended to ensure continued maintenance of casks have proved inadequate?

(j) [If the answer to i is other than an unqualified yes], what about the discovery by the purchaser of 2 NAC-1 casks of bowing in the baskets which hold the spent fuel rods in place after the casks had been used for approximately 103 shipments?

ANSWER: The assertion was based on information provided in a 1980 NRC Study, Transportation of Radionuclides in Urban Environs: Draft Environmental Assessment, NUREG/CR-0743, commonly referred to as the "Urban Study".

(a) The response in the EAs (DOE/RW-0073, Vol. 3, in Section C.2.4.1.2.3) does not specify the assumptions used in making the calculation of potential human error risk, however, the Urban Study indicates that a single human error affects only one shipment.

(b) Any analysis of the potential risks from human errors will currently be based on extremely limited data. The record of transportation of spent fuel has been excellent, thus producing little data for realistic analysis. The assumptions made in deriving potential release fractions, etc. used in the Urban Study were based on a total of 16 incidents out of a total of 3939 shipments.

"Deviations in accepted QA practices include both failure to adhere to normal procedure and lack of quality control" (The Urban Study, p. 71). Of the 16 incidents, only one resulted in any release to the environment and this factor was included in the derivation of fractional occurrences and release fractions for the analysis. The analysis did not extend to design or manufacturing errors, since it was assumed that appropriate care was taken in the processes of design and manufacturing. The NRC certification process is intended to detect design errors and to prevent major design and construction flaws from becoming a significant contributor to the occurrence of many accidents involving a single cask design.

(c) State-of-the-art technology for engineering design, analysis, and testing are continually being enhanced, and when assessing whether errors are made, one must look at both the technology and regulations at the time. Tests provide evidence of meeting regulatory criteria and offer designers an opportunity to verify analysis. The fact that regulations change reflects an enhanced understanding of the system's performance of radioactive materials packaging; however, even with some uncertainty (as opposed to errors) in previous design and licensing of Type B packagings, there has never been a release of radioactivity to the environment following an accident.

(d) We are not aware of how engineers at Lawrence Livermore National Laboratory have described the original computer model puncture test.

(e) See 17c above.

(f1) The MH-1A cask was designed, built, and licensed in the mid-1960's for the Army's MH-1A reactor fuel. The cask was granted Special Permit No. 6639 in 1972 by the DOT and a Certificate of Compliance No. 6639 by the Atomic Energy Commission. In January 1979, a supplement to the Certificate of Compliance was requested for use of MH-1A for contents other than the original irradiated fuel elements. As is customary, NRC reviewed the amended Safety Analysis Report for Packaging (SARP) to ensure design adequacy by current technology at the time. This review identified new issues with the MH-1A design and resulted in a new SARP from which further issues were identified that may require testing to resolve.

The DOE has reviewed all questions raised by NRC. Discussions with the NRC over the past year have identified the ways to resolve these questions. It is noteworthy that seal damage would not result in loss of containment. The spent fuel is solid form and could not be released or dispersed in a severe accident.

(f2) The situation indicated is basically correct.

(g) Past practices to assure quality in casks that have been built have had both successes and failures. Errors are never fully controlled by Quality Assurance (QA) programs, but the number and severity of problems are reduced when a good program is in place. The required NRC programs have minimized quality problems but did not and will not eliminate all defects. However, defects are expected to become even smaller in number and severity as a result of new initiatives by the NRC in prescribing required QA programs for cask design, construction, and maintenance.

(h1) The event alluded to here occurred in a fire test that had extended to three times the regulatory duration and resulted in a crack as described in the question. However, the crack penetrated the outer shell of the cask, and did not in any way breach containment or shielding of the cask.

(h2) To our knowledge the situation described did not occur. Copper fins were welded to the outer shell of the cask between the inner and outer shell of the cask to assist in heat transfer, not to compensate for insufficient shielding. The welds were not done by approved methods and resulted in some cracking of the outer shell of the cask. Again, this was a QA breach but not of high potential consequence. The problem is now better understood and would be controlled by current Quality Assurance (QA) practice and requirements.

(i) Past QA practice did not require the same degree of recordkeeping and care as is currently provided under revised QA procedures.

(j) To our knowledge the bowing referred to was discovered in a QA inspection and reported to the NRC which acted to control the problem.

QUESTIONS FROM SENATOR ADAMS

QUESTION 1: Please clarify your position on whether or not Congress must affirmatively act to disapprove your proposed amendment to the Mission Plan if it is inconsistent with the Nuclear Waste Policy Act?

ANSWER: The schedules set forth in the draft amendments to the Mission Plan were based solely upon programmatic judgments. They were not intended to set forth any particular legal position, but rather to describe the Department's considered and informed judgments, based on its actual experience in administering these programs, of the course and timing that the first and second repository programs should take given current circumstances. The Department recognizes that carrying out these programs in the way described in the proposed amendments to the Mission Plan will require Congressional approval.

QUESTIONS FROM SENATOR ADAMS

QUESTION 2: Please provide a schedule of activities you will conduct to comply with the requirements of Sec. 112 and 114 of the Nuclear Waste Policy Act to site a second repository, including the date when this action will be initiated or by what act or inaction of Congress it will be initiated.

ANSWER: As indicated in the draft Mission Plan Amendment, the specific requirement in the Nuclear Waste Policy Act regarding availability of the second repository is stated in terms of the maximum amount of fuel that can be emplaced in the first repository until a second repository is in operation. The Act sets this figure at 70,000 MTU. With the currently designed annual receipt capability for the first repository, the 70,000 MTU limit will not be reached until after the year 2020. Site-specific studies for the second repository need not start until the middle to late 1990's in order to have the second repository available after 2020. The Department will continue to monitor all pertinent factors - projections of spent-fuel discharge rates, the rate at which the first repository is filled, and the time needed to develop the second repository - to determine the schedule for the second repository.

When site-specific studies are proposed to be initiated, the work to be done will be described in the President's budget submitted to Congress for

ANSWER 2: (Cont'd)

approval. Action by Congress on the budget request for site-specific studies will be required.

QUESTIONS FROM SENATOR ADAMS

QUESTION 3. Please confirm whether or not the September 5, 1986 legal memorandum from J. Michael Farrell to Benard C. Rusche concerning the relationship between the Mission Plan and the requirements of the Nuclear Waste Policy Act is the dispositive legal position of the Department on this issue. If not, please provide any additional legal position or memoranda concerning the relationship of the Mission Plan and amendments to the Mission Plan and the Nuclear Waste Policy Act.

ANSWER: The memorandum of September 5, 1986 from the General Counsel to the Director of the Office of Civilian Radioactive Waste Management is the position of the Department regarding the legal relationship between an amendment to the Mission Plan and the timing of the recommendations required to be made to the President and to the Congress under sections 112 and 114 of the Nuclear Waste Policy Act of 1982.

APPENDIX II

Responses to Additional Committee Questions From the February 4, 1987 Hearing

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OFFICIAL CO[illegible]
PLEASE R[illegible]
SENATE COMMITTEE ON [illegible]
MAR 1 3 1987

JBJ ✓
RP

RICHARD H. BRYAN
Governor

STATE OF NEVADA

COMMISSION ON NUCLEAR PROJECTS
Capitol Complex
Carson City, Nevada 89710
(702) 885-3744

GRANT SAWYER
Chairman

Commissioners:
Frank Caine
James Cashman III
Thalia Dondero
Ron Lurie
Michon Mackedon
Anne Peirce

Robert R. Loux
Secretary

March 9, 1987

The Honorable J. Bennett Johnston
Chairman, Committee on Energy
and Natural Resources
U.S. Senate
SH-136 Hart Senate Office
Building
Washington, D.C. 20510

Dear Chairman Johnston:

Enclosed please find responses to questions which you and Senator McClure have requested that I answer. I regret any delay in responding, however, the questions which you have posed have required some rather in-depth response, as you will note. I appreciate the opportunity to put Nevada's case before you, and I am sure you will find our responses comprehensive.

Should you have any questions, please do not hesitate to contact me.

Sincerely,

Robert R. L

for Grant Sawyer, Chairman
Nevada Commission on Nuclear
Projects

GS/gjb

Enclosure

RESPONSES TO QUESTIONS POSED BY SENATOR BENNETT JOHNSTON

STATE-DOE COOPERATION

1. Do you believe that your State has made a good faith effort to cooperate with the Department of Energy? Describe the contacts with DOE that you initiated. What were the results?

Response: In discussing the issue of interaction between the Department of Energy (DOE) and affected states/tribes, it is extremely important to consider the divergent perspectives from which interaction (in terms of consultation and cooperation) is approached. A fundamental problem (perhaps the fundamental difficulty) in state/tribe - DOE relationships lies in how the parties view the provisions in the Nuclear Waste Policy Act (NWPA) which require DOE to consult and cooperate with affected states and tribes.

From the onset, DOE has interpreted consultation and cooperation in a very limited way. DOE provides information, holds meetings, solicits State comments on draft materials at the same time it solicits public comments and generally goes through the motions required in traditional bureaucratic interactions. However, no attempt is made to provide states/tribes with early, substantive, and meaningful opportunities to shape decisions and influence program policy and implementation. There is a great deal of form but very little substance in DOE's interpretation of its duty to consult and cooperate.

States and tribes, on the other hand, view "consultation and cooperation" as a requirement for a more collaborative approach to program decision-making in areas where states/tribes have important interests. Nevada and other states have looked to DOE to provide more than token opportunities to comment on draft documents or review draft policies, when, in fact, decisions have already been substantially made. DOE is already so committed to a course of action that State comments/recommendations are superfluous. States have attempted to encourage the acceptance of a definition of consultation and cooperation which acknowledges the unique oversight role provided for potential repository states by the NWPA. Such a definition requires that states be involved early and in a meaningful manner in key decisions and activities so as to enable those states to actually have the opportunity to influence program policy and direction.

It should be noted that DOE intransigence in cooperating meaningfully with Nevada appears to emanate primarily from DOE/OCRWM headquarters. The Department's Nevada Project Office has been much more willing to cooperate with the state in a more substantive manner.

Officials of the State of Nevada have made a good faith effort to cooperate with the Department of Energy. On a number of occasions, meetings between Nevada officials and DOE Nevada Operations personnel have produced agreement on how we will interact. One such series of meetings produced a "Protocol" which specified how Nevada's technical contractors would gain access to the Yucca Mountain site to do independent testing. The "Protocol" was even signed by the Nevada DOE project management. Later DOE headquarters disavowed the agreement and denied funding for Nevada's independent testing.

Generally speaking, contacts with DOE, which are initiated by Nevada, seek information or propose technical study by U.S.

DOE or State contract personnel. Also generally, DOE's response is invariably very slow, overly analytic, bureaucratic, negative and frustrating to State efforts to participate.

An example of contacts initiated by the State is Nevada's repeated request in 1985-1986 to be made aware of the method by which DOE would decide which five of nine sites would be nominated and which three of five states would be chosen for characterization. This request was made orally and in writing to various individuals including William Purcell, OCRWM Director of the Office of Geologic Repositories, and OCRWM Director Ben Rusche. DOE refused to disclose the method until after site selection decisions were announced.

Another example of state-initiated contacts involved the Nevada Commission on Nuclear Projects' invitation to Mr. Ben Rusche to address the Commission on May 16, 1986. Mr. Rusche arrived in Las Vegas at 11:00 a.m., addressed the Commission and departed the meeting by 12:00 noon. He took no time to listen to citizen concerns which were scheduled to be heard later that afternoon. Chairman Sawyer asked Mr. Rusche specifically at that meeting what the decision methodology would be for site recommendation and whether Nevadans were accurate in assessing that Yucca Mountain had already been chosen. Mr. Rusche refused to divulge the decision methodology and stated that no decision had as of then been made selecting Yucca Mountain. In retrospect, it now appears that statement was false. The final action announcing the formal decision was made May 28, 1986, only twelve days later. Mr. Rusche's subterfuge prohibited any state participation in that decision. Finally, please recall that the requirement of the NWPA is that DOE cooperate with the state, not vice versa. See Section 117(b). In fact the requirement is that DOE "consult and cooperate" with the state. The clear connotation of this language is that DOE must ask the state's opinion on various programmatic matters, and give that opinion serious consideration. To date, this has not happened.

Nevada has commented in nearly every instance in which DOE has provided the opportunity. In the case of Nevada's comments on DOE's Draft Environmental Assessment, DOE essentially ignored over 800 pages of Nevada's suggestions. In a prior major interaction experience, the development of siting guidelines, DOE refused to consider the objective approach Nevada recommended, and which we believe the Act requires.

2. Do you believe that the DOE has made a good faith effort to cooperate with your State? Describe the contacts with you that were initiated by DOE. In these cases, what were the results?

Response: DOE's effort to cooperate with Nevada cannot be regarded as having been made in "good faith". Rather it has been perfunctory. DOE's ordinary method is to develop a position or procedure in advance, then inform the State of its decision. DOE has held many meetings where it provides states with information about policies and decisions, and then records these dates in a cumulative list purporting to indicate DOE's level of cooperation. DOE has never brought real agency decision makers to Carson City and to sit down with Nevada personnel and discuss, in advance, the philosophy and approach of any particular decision.

An example of DOE's attempts to cooperate with states on issues of considerable importance to those states involves DOE's invitation for states and tribes to participate in various issue-specific "coordination groups." Nevada (and other states) learned in 1985 that DOE was holding regular coordination group meetings for socioeconomic issues, transportation issues, environmental issues and quality assurance issues. These meetings were initiated by DOE as planning and decision-making sessions to be attended by DOE staff (Headquarters and Project Office) and contractors working on specific aspects of the high-level nuclear waste program. After considerable prodding, DOE invited affected states and tribes to attend these meetings, ostensibly to provide a forum where states/tribes and the Department could work cooperatively in a "hands-on" manner, to address common interests in the areas of socioeconomics, transportation, environmental assessment and quality assurance.

The concept appeared to be a promising one. However, from the time states/tribes began attending meetings, the format and content of those meetings was changed. Instead of being forums where states/tribes and DOE worked cooperatively to arrive at mutually acceptable approaches and decisions, the meetings have become sessions where DOE makes presentations and where state's concerns are taken down as "action items" for DOE review at future times. No DOE decision makers are present so no real work gets accomplished. Rather than meaningful joint working sessions, the coordination group meetings have become, essentially, DOE show-and-tell forums.

Nevada has repeatedly sought participation in DOE socioeconomic and environmental monitoring and mitigation plans. State and local representatives met on several occasions with DOE/Nevada staff and contractors and provided DOE with issues and factors to be considered in the plans. When these contacts first began, DOE/Nevada promised that State and local concerns would be given full consideration and that the monitoring and mitigation plans would be developed cooperatively with state and local representatives. DOE Headquarters' directives during the summer and fall of 1986, however, prohibited the DOE/Nevada office from fulfilling that commitment and even prohibited DOE staff and contractors in Nevada from meeting with State or local officials until after November of 1986. As a result of this DOE policy of total non-cooperation, not one of the State/local issues was addressed in the draft monitoring and mitigation plans released in late November 1986.

Nevada believes that the Nuclear Waste Policy Act clearly requires DOE to consult and cooperate with the State, and that the burden of effectuating such consultation and cooperation rests with the Department. In this regard, DOE must ask the State's opinion on various programmatic matters and then give such opinion serious consideration. This has not happened in the program to date.

SITE-SPECIFIC TECHNICAL ISSUES

1. What do you consider the most important technical, scientific or engineering reasons why your site is inappropriate for a repository? Do you believe that DOE is ignoring scientific information about these matters? What information?

Response: Concerns about the technical adequacy of the proposed Yucca Mountain repository site in southern Nevada have been around for a number of years. Questions from the scientific community have centered on the high potential for technical flaws at the site given the active nature of the geologic environment in Nevada.

The National Academy of Sciences (NAS) first expressed concerns about technical factors in 1979 in correspondence to the Department of Energy (letter from E.F. Gloyna to S. Meyers, dated April 23, 1979). In early 1979, DOE came to the NAS - Committee on Radioactive Waste Management and requested the Committee's preliminary views on the potential of tuff, particularly in southern Nevada, as a repository host rock. In the April 23rd letter, the NAS, while admitting the long and deep groundwater flow paths, low-water velocities, low population, and extensive federal land ownership were attractive attributes, identified potential difficulties associated with tuff as a medium for radioactive waste isolation. These potential difficulties, considered fundamental by the NAS, focused on the seismic and volcanic stability of candidate areas of tuff, the significant lateral variations in thickness and character of tuff, the fact that tuff terrains are typically broken by faults into blocks of varying size, the stability of tuff in the presence of hot electrolyte solutions, and the possible presence of natural resources. In concluding the letter, the NAS suggested that "explorations and investigations be conducted in a logical sequence so as to assure that certain fundamental questions are addressed first before major resources are committed." (Emphasis supplied).

In 1983 after the Nuclear Waste Policy Act was passed and the Nuclear Waste Project Office was established by the Governor to provide Nevada oversight of the program, the State set out to define and understand what might be the technical issues concerning a repository sited in tuff in southern Nevada. This office reviewed the NRC regulations on siting high-level radioactive waste facilities (10 CFR Part 60) and the EPA standards for management of high-level radioactive waste (40 CFR Part 191) and consulted with State and university scientists knowledgeable of geologic, hydrologic, and engineering characteristics of tuff and the southern Nevada area. Based upon that review and analysis, the State established two lists of issues critical to health, safety and the environment. One list addressed site suitability issues and the other addressed site performance issues. Site suitability issues include:

1. Characterization of moisture movement through the unsaturated zone.
2. The relationship of Yucca Mountain groundwater regime to the regional acquifer system.
3. The effect of future climatic variations and resulting changes in the hydrogeologic regime on the integrity of the site.
4. The effects of future faulting or other tectonic events on the integrity of the site.
5. The effects of future volcanism on the integrity of the site.
6. Human interference of the site due to perceived presence of extractable natural resources.

Site performance issues include:

1. Groundwater travel time to the accessible environment.
2. The effect of host rock geochemistry on the retardation of radionuclide transport.
3. The effect of fuel cladding, waste canister materials, and

backfill in preventing or restricting radionuclide transport.

4. The uncertainty in projecting performance assessments to the 1,000 and 10,000 year time periods.
5. Maintenance of waste canister retrievability option.
6. The design and reliability of a long-term repository monitoring network.
7. The maximum expected radionuclide release rate from the engineered system.

In December 1984, the DOE issued a Draft Environmental Assessment for the proposed Yucca Mountain site. Comments of the State, issued in March 1985, cited major deficiencies in the technical assessment of the site. Our analysis concluded that technical evidence was available which suggested that four conditions which could disqualify the site might be present at Yucca Mountain. These four disqualifying conditions were:

(1) Tectonics

The DOE Siting Guidelines for nuclear waste repositories indicate that a site should be disqualified if fault movement and other ground motion would result in loss of waste isolation. The Draft EA acknowledged that Yucca Mountain is in a tectonically-active area and the faults on Yucca Mountain may be "potentially active," but indicated these present no problems for siting a repository at Yucca Mountain. However, the State found that a reasonable interpretation of the available information suggested that a large earthquake with accompanying surface faulting could probably occur during the lifetime of the facility, with the possibility of loss of repository integrity.

(2) Geohydrology

The Siting Guidelines indicate that a site should be disqualified if the groundwater travel time from the repository to the assessable environment is less than 1,000 years. The Draft EA admitted that necessary hydrologic parameters for the unsaturated zone were poorly known and much uncertainty existed in the model calculations, but results indicated groundwater travel times ranging from 20,000 to 50,000 years for the site. However, State calculations, using conservative approximations to bound numerical uncertainty, found that groundwater travel time could range from 900 to 34,000 years. The minimum number for groundwater travel time would not meet the geohydrologic requirement.

(3) Off-site Installations

The Siting Guidelines indicate that a site should be disqualified if atomic energy defense activities conflict irreconcilably with repository activities. The Draft EA stated that there would be no conflict because of engineering design which would accommodate weapons testing effects and coordination of repository schedules with testing schedules would minimize safety concerns. The State found, however, that a repository at Yucca Mountain might conflict with future weapons testing and the established mission of the Nevada Test Site. The State acknowledged that the long-term future of atomic testing was uncertain, but if testing would continue in the future, areas in close proximity to Yucca Mountain would likely be locations for such testing. The State believed this guideline could not be satisfied without documentation from the Department of Defense that future atomic testing would not conflict with a waste repository at Yucca Mountain.

(4) Water Quantity and Quality

The Siting Guidelines indicate that a site should be disqualified if repository activities would degrade water quality or reduce water quantities for human consumption or crop irrigation. The Draft EA found that repository water use would not lower the regional groundwater table or reduce water quality. The State found there was insufficient information provided in the Draft EA to judge the impacts of repository water use on water quantity or quality. Amargosa Valley, down-gradient from Yucca Mountain, could be affected in the long term by degradation of the groundwater by repository activity.

State reviewers identified other areas of technical concern with the Draft EA mineral resource potential, risk of volcanic eruption, possible changes in future climatic conditions, instability of underground repository openings, and flash flood protection.

The Nuclear Regulatory Commission has also expressed concern with the technical suitability of the Yucca Mountain site. In December 22, 1986 letter report to Stephen Kale, Office of Geologic Repositories-Department of Energy, the NRC staff concluded that the Environmental Assessment for Yucca Mountain was overly favorable or optimistic in its technical assessment of the site. While the NRC acknowledged that all information on the site is not yet available, the environment assessment did not acknowledge alternative interpretations which could be reasonably supported by existing data; did not identify the uncertainties associated with the limited existing data base, and it did not consider the uncertainties or alternative interpretations in its evaluations and conclusions.

The same letter report contains nine major comments authored by NRC staff. Three of the comments address faulting at or near Yucca Mountain. NRC staff contends that literature evidence suggests that faults in the vicinity of Yucca Mountain should be considered to be potentially active. The high state of stress measured on Yucca Mountain suggests that north-south trending faults could be reactivated by nuclear weapons tests. Further, the omission of a comprehensive discussion of northeast-trending strike-slip faults reflects an inadequate recognition of the current uncertainties regarding the nature and rates of fault movement. Also the EA failed to acknowledge U.S. Geological Survey literature which suggests that detachment faulting may be a much more important element in the tectonic setting of Yucca Mountain than previously believed.

Another NRC comment raised concern that the potential for hydrothermal activity, which is often associated with volcanic activity, was not addressed in the EA. Staff contends there may be potential for hydrothermal activity and hence the potential for such activity to create new flow paths and adversely affect the waste package.

Staff also raised concern that an analysis of historical mining and prospecting in the area of Yucca Mountain was not sufficient to assess economic potential inasmuch as natural resource exploration has been banned within the Nevada Test Site for over 30 years. The EA did not recognize the direct knowledge currently available about natural resources at Yucca Mountain and overlooked various indirect lines of evidence which suggests the presence of significant economic natural resource potential.

Concern was also expressed by NRC that, because the ability of the geochemical system to effectively retard radionuclide migration was highly speculative, it is not unreasonable to assume significant increases in radionuclide transport to the accessible environment due to change in climate or geohydrologic conditions.

NRC staff also questioned DOE's confidence in the calculation of groundwater travel time. They stated that the "many assumptions, hypotheses, and approaches used in the analysis did not incorporate uncertainties associated with available data." The specific problems relative to the calculation of groundwater travel time are 1) uncertainties affecting the groundwater travel time calculations; 2) uncertainties connected with parameters input to models as random variables, and 3) uncertainty with regard to vertical movement of groundwater. Staff cautioned that the use of 0.5 mm/yr. for an upper bound for flux for groundwater travel time is not substantiated and that higher values should be considered. Their review further suggests that under certain conditions, fractures flow could occur at flux values less than 0.5 mm/yr., thereby producing groundwater travel times of substantially less than 1,000-year travel time required by EPA.

NRC likewise questioned the two mechanisms -- matrix diffusion and sorption -- which would diminish radionuclide releases to the accessible environment and suggest that colloids present in the groundwater may lessen the effectiveness of matrix diffusion for retarding radionuclide transport and may in fact enhance migration. Research described in scientific literature suggests that zeolites and clays are not effective sorbers of plutonium or americium, major elements in radioactive waste.

The NRC's final major concern is that the 3,000-year waste package container life proposed in the EA is neither realistic nor conservative. Research conducted by NRC contractors for a range of simulated Yucca Mountain environments confirms the overestimation of the waste package lifetime. In NRC's view, the EA should fully acknowledge the uncertainties in current waste package analyses and the limited data base available.

In summary, the State of Nevada is in agreement with both the National Academy of Sciences and the Nuclear Regulatory Commission staff relative to concern with the technical adequacy of the Yucca Mountain. Technical flaws appear to be present at the site. These include the occurrence of active earthquake faults at the site, the potential for recurrent volcanic activity within the engineered life of the repository; the potential for significant economic natural resources beneath the mountain; possible adverse affects on repository performance from nearby nuclear weapons tests; and uncertainty about the site's ability to meet the 1,000-year groundwater travel time mandated by the EPA. In the past, the State has attempted to assess the validity of these suspected technical flaws by proposing to perform independent technical studies. Even after the U.S. Ninth Circuit Court of Appeals concluded that the State was entitled to perform such studies as part of its lawful oversight role, DOE has continued to frustrate and delay State grant funding for those studies. The fact that DOE has yet to adequately address crucial and perhaps even disqualifying technical questions may be seen as further evidence of the Department's reluctance to seek answers which may not be to its liking.

ADEQUACY OF FIVE STATES

1. DOE claims that all five of the sites nominated for the first repository are quite adequate to be considered for characterization and that the projected performance of any of these sites will far exceed applicable EPA standards for releases of radioactivity. Isn't this true?

Response: Nevada has no confidence in DOE's claim that all five sites nominated for the first repository are adequate based on "projected performance" of EPA off-site release standards. First, EPA staff has itself admitted that the proposed EPA standard was tested against what was then known about the Hanford site, that the proposed standard was discovered to disqualify Hanford, and that the standard was thereafter altered (made more lenient) so as to permit Hanford's further consideration. Further, the definition of the interior limits of the geographical area to which the standard would be applied were modified to permit DOE to define the "disturbed", or pollutable, area in an amoeba-like or gerrymandered way, permitting extension of interior limits in favor of easier DOE compliance. Additionally, DOE's conclusion with respect to respective sites' performance in relation to the EPA standards was made through the application of DOE's site selection guidelines, which are subjective. A different analyst could easily reach a different conclusion using the same data and the same guidelines.

Specifically with respect to Yucca Mountain, NRC staff has criticized DOE's disregard of active faulting, hydro-thermal activity, the presence of ore deposits at the site, and DOE's over reliance on geochemical retardation, groundwater travel time modeling and an engineered barrier system performance in analyzing the site. DOE's conclusion with regard to the EPA release standard is not well based and is self serving.

2. If DOE's contention is true, what do you think its implications are for site selection?

Response: If DOE's contention is true, that sites chosen essentially at random for their technical isolation properties all meet adequately stringent environmental standards, then the implication for the program is that there are undoubtedly many more such sites in the nation sites, which could be explored in hopes of finding a best site.

"FIXING THE PROBLEM"

1. Suppose you could make a list of the things you'd want DOE to do differently within the framework of the Act in considering the site in your State. Assume that if DOE agrees to make the changes indicated on the list, then you will cooperate in allowing site characterization to proceed. Could such a list be drawn? Or do you just want your site dropped from consideration? If such a list could be drawn, what would be on it?

Response: Nevada believes that the solution to the current problems facing the nuclear waste disposal program lies, simply, in a return to the letter and intent of the Nuclear Waste Policy Act. DOE must be forced to implement the Act as Congress originally intended. While specific deadlines in the Act may no longer be operative (because of DOE's ineptitude in implementing the law to date), the overall framework, philosophy and approach to siting, constructing and operating a waste disposal system remains valid. However, if a solution to the nuclear waste problem is to be found and a repository sited, there must be a commitment by DOE and Congress to a truly objective siting process wherein technical and scientific factors are allowed to dictate the choice of sites.

A list of things Nevada would want DOE to do differently, though not exhaustive, would include the following:

1. Define in advance the technical parameters of a fully engineered high-level radioactive waste geologic repository capable of isolating waste until its radiologic character is benign (i.e. no longer toxic); this is not now explicitly required by NRC and EPA.

2. From that definition, determine the technical parameters of natural hydrologic, geologic, tectonic, geochemical, and seismic systems which would act as a substitute for all of the engineered system. Reduce the technical parameters to quantitative terms and promulgate them as new site selection guidelines. (Retain the current economic, social and political parameters required by Section 112(a) of the NWPA and discard the rest of the current guidelines.) Incorporate within these new guidelines the premise that no site or location is considered suitable until there is evidence which proves that to be the case.

3. Screen the nation's geology for sites likely to possess quantitatively adequate technical parameters without first

considering the socio-political issues of ease of siting or land ownership.

4. Define the safety and health risks of transportation of spent fuel over specific routes.

5. Balance the known information about the technical parameters of each site against the safety and health risks of utilizing those sites and the transportation of spent fuel thereto.

6. Select for characterization all those sites which present promising prospects of significant radionuclide isolation potential which, on balance, present the least health and safety risks prior to repository closure. Commit to selecting only the three best sites from among all available for characterization. Commence characterization of at least three sites so as to comply with the NWPA modified NEPA requirement.

7. Throughout site screening and analysis, (characterization) commencing with systems design, incorporate state and local knowledge of the respective geology. Discover how best to analyze it. Design the research system so that it asks open ended questions and is really inquisitive in nature. Attempt to resolve technical questions about which state and local technical professionals are concerned using the investigative approach or methodology which such professionals believe will resolve their questions. Manage the site screening and characterizations program as close to the site as possible, but integrate this management by means of a single system engineering contractor. Grant on site management personnel the authority to commit and make decisions regarding the program when state or local technical professionals need specific commitments/decisions.

8. Don't hurry against an uncompromising schedule which thereafter becomes compromised at the whim of the program's administrator.

9. Listen to and heed comments and suggestions offered from others.

10. Make decisions in the open.

11. Don't modify results of requested advice to serve preconceived programmatic objectives.

NOT IN MY BACKYARD

1. Every state being considered for a repository knows several reasons why the site should not have been chosen for characterization. What would be your response to allegations that your objections are being raised only to avoid the location of a repository in your state?

If the State of Nevada were to base its case for elimination of the state as a potential repository location on a "not in my backyard" argument, it would probably have a fairly strong case. First, Nevada already bears a major share of the responsibility for the nation's nuclear arsenal in its "backyard". Moreover, 83% of Nevada land is owned by the United States government. Other areas of the country have chosen nuclear power, with its attendant waste problem, as an energy alternative. Nevadans have not. Even those states with nuclear reactors in their front yards argue that nuclear waste should not be buried in their backyard. Yet those states reap the benefits of the nuclear energy.

While Nevada representatives are quick to point out the fact that the State has already done much more than its share to support the nation's nuclear programs, that argument is really only a sidebar to the main issue of concern to Nevada -- the issue of the technical suitability of the Yucca Mountain site. The fact that Nevada has contributed heavily to the country's atomic activities would, obviously, be a factor in the event that Yucca Mountain and one or more sites in other states (without Nevada history of service in this area) were found to be equally the best and most suitable available. At that point, Nevadans would expect Congress to recognize the fairness in spreading the country's nuclear burden more equitably. However, the Yucca Mountain site appears to be seriously flawed and is almost certainly not among the best sites that can be found from a technical perspective.

GARDNER PROPOSAL

1. What is your opinion of Governor Gardner's proposal for a non-binding conflict resolution process to develop a consensus on how to proceed with the program? Would this solve the problems with the program as you see them? Why or why not?

Response: Governor Gardner's proposal is not likely to be implemented as it calls upon parties to negotiate when it is not currently in their self interest to do so. DOE has declined. Second round states perceive themselves better protected by current political power than through negotiation. Governor Gardner's proposal is based on an assumption that the Department of Energy will enter into good faith negotiations with other parties involved in the nuclear waste program. It also assumes that DOE will be willing and able to approach the high-level waste program from a standpoint that eschew political and other non-technical influences that have driven DOE's management of the waste program to date.

DOE has shown little inclination to change its ways. It continues to deny states the funds required to perform adequate oversight and independent confirmatory studies. It persists in limiting state involvement in key decisions and program activities. Nevada has offered to negotiate the issues which underlie the State's legal actions against the Department and DOE has refused. The current DOE-implemented waste program is so flawed that a "conflict resolution" approach is not likely to result in a successful outcome. What is needed is a commitment from the Department to retract the siting decisions that have been made to date and begin the NWPA siting process over again using new, objective siting guidelines and with a stated purpose of finding the best and safest site for a repository.

NEED TO AMEND THE ACT

1. Are you asking Congress to amend the Nuclear Waste Policy Act to address the issues you raised in your testimony? If so, could you describe your proposed amendments to the Act? If not, how do you propose that the Department move forward with the program?

Response: Nevada does not ask for amendment to the NWPA at this time, but rather for Congressional enforcement of the Act. We propose, as a starting point, that DOE be required to promulgate new, adequate and objective siting guidelines and move forward by complying with the law in both letter and spirit.

ECONOMIC BENEFITS

1. What economic (or other) benefits are there for our State or tribe if your site is chosen for the repository?

Response: It is not possible to look at the economic benefits of a repository apart from the potential economic, social, environmental and other costs that may be associated with such a facility. Only after a thorough examination of the cost-benefit ratio has been completed, can a realistic picture of possible repository effects (both pluses and minuses) be obtained.

The Department of Energy has consistently sought to exaggerate the potential economic benefits of a repository in Nevada while ignoring or downplaying the possible negative aspects. The only attempt by DOE to address the economic aspects of repository siting in Nevada is in the Environmental Assessment (EA) for the Yucca Mountain site. That document was seriously deficient in its analysis of economic costs/benefits. State reviewers concluded that the EA presented a "best-case" scenario that minimized potential impacts to the social and fiscal systems of southern Nevada. It ignored risk, assumed unchanging demographics, and proceeded from the premise that all markets function with perfect information. It used a model of questionable validity and ignored relevant differences between two of counties bordering the site (and ignored the rest of the state entirely).

The methodologies employed to estimate such crucial elements of the socioeconomic-impact-analysis formula as direct and indirect labor-force numbers, settlement patterns of immigrating workers, and even the number or percentage of immigrants expected were either lacking altogether or seriously deficient.

Nowhere was the calculation by which DOE arrived at direct repository employment explained. Such calculation is crucial because it drives a number of other key variables in the socioeconomic analysis, including total employment, which, in turn, provides the basis for projecting impacts on local communities (and on the state).

The fact that direct employment at the Yucca Mountain site was initially estimated to be almost 200 percent greater than for any of the other nine sites would seem to indicate that repository employment figures were greatly overstated. The fact that there was no explanation in the EA as to how direct-worker estimates were arrived at may be seen to indicate that the numbers have been intentionally inflated. Such speculation is further fueled by the limited information that is available in reference material relative to labor-force calculations. Those initial estimates contained "contingency" factors of up to 40 percent and inflated employment numbers by another 15 to 18 percent because of the manner by which fringe benefits were incorporated into the equation.

Indirect employment figures were likewise suspect because of the use of a multiplier that was between 2½ and 5 times larger than multipliers employed for any other site. State agency reviewers consistently questioned the applicability of such a large multiplier even for the more cosmopolitan Clark County, which has a more diverse and sophisticated overall labor force than rural Nye County.

DOE consistently focuses on employment and income gains that will occur as the site is developed and just as consistently ignores the declines in employment and the negative impacts on local revenues and markets that could occur as the project moves from construction to operations and from operations to closure.

Another major area where DOE's economic analysis is seriously deficient involves the analysis of potential repository-related impacts on the primary sector of Nevada's economy -- tourism. The tourism analyses contained in the EA and in supporting and subsequent materials are superficial and largely irrelevant. DOE attempted to infer that because impacts on tourism as a result of major hotel fires and the Three Mile Island incident were short-lived and minimal, a repository (and related shipments of nuclear waste passing through Las Vegas over 30 years) will have little effect on the State's tourism industry. Not only is such treatment of this crucial subject inadequate and misleading, but it also fails to differentiate between short-term, crisis-related events and the implications of a project that will be ongoing for 10,000 years. Likewise, any attempt to relate tourism at places like Harrisburg, Pennsylvania, to tourism at Las Vegas is superfluous. As with so much of DOE's work, there is an obvious attempt to treat conjecture and opinion as fact -- and then to infer a lack of negative consequences as a result of such "facts."

Because DOE's conclusions relative to economic benefits/costs associated with a repository are suspect and unreliable, the State of Nevada has undertaken a comprehensive socioeconomic impact assessment study aimed at examining objectively and realistically the possible costs and benefits of a repository in the state. It should be pointed out that, despite the provision of voluminous materials explaining and justifying the State's program, DOE has, to date, refused to provide all of the funds needed for this important study during 1987. DOE's reluctance to adequately support State economic assessment efforts probably says a great deal about the Department's underlying belief as to what the real cost-benefit ratio is likely to be.

2. What discussions have you had with DOE about economic benefits?

Response: The State of Nevada has only discussed potential economic benefits with DOE in the context of commenting on the Environmental Assessment. Until DOE is willing and able to discuss benefits in relation to costs, it is superfluous to attempt any productive dialogue.

Several local governments in southern Nevada have attempted, over the past two years, to ascertain from DOE the materials, equipment, supplies, and services requirements of a Nevada repository in order to help local businesses and industries in the procurement process. DOE has not responded to local inquiries, even though site characterization officially began on May 28, 1986, and exploratory shaft construction is due to start in 1988.

3. Would more serious discussion of potential economic benefits, for both the period of site characterization and construction, increase your state's willingness to go along?

Response: Any discussion regarding economic benefits of a repository in Nevada is extremely premature and detracts from the real issues involved with the siting of a facility at Yucca Mountain. First, as pointed out above, any direct economic benefits of a repository must be balanced with a clear picture of possible economic and other liabilities. Such a balanced analysis is lacking at this time. However, once accomplished, it is likely to reflect a situation where, at best, the costs/benefits are about equal, or at worst, where the economic and other negatives outweigh the potential benefits.

Prospective *indirect* economic benefits associated with a state's acceptance of a repository -- such as linking the supercollider project to the repository represent a somewhat different situation. Here we are talking about *compensation* to one state for accepting something other states are unwilling to accept but is in the nation's interest to develop. Such an approach would certainly sweeten the deal for a state ultimately selected for the repository. However, in Nevada's view, discussion of linking the supercollider project or any other such compensatory project to the acceptance of a repository by *any* state before the site within that state has been proven to be technically suitable for isolating the extremely toxic nuclear materials to be disposed of there, is not only inappropriate but even irresponsible.

The Nuclear Waste Policy Act requires that technical factors relative to site suitability be the predominant criteria by which a repository location is selected. To offer economic benefits and compensation to a state before a repository site has been deemed suitable -- or, in the case of Nevada, where the Yucca Mountain site has been shown already to have potentially serious flaws -- is to infer that the technical viability of a site is less important than political and other considerations. Nevada believes that such an approach will only confuse the important issues surrounding site selection and could have disastrous consequences should a technically inferior site ultimately be chosen as a result of the emphasis placed on economic benefits and compensatory factors.

LAWSUITS

1. What are the main contentions in lawsuits that you have filed against DOE concerning the nuclear waste program? Please provide a list of the pending lawsuits, where they are filed, and the status.

Response: Nevada is petitioner in the following lawsuits, all filed in the Ninth Circuit Court of Appeals:

1. Nevada v. Herrington, 777 F. 2d 529, (Ninth Cir. 1985). the Court found in Nevada's favor regarding funding for independent technical studies under Section 116(a) of the NWPA. DOE has not yet funded several of these studies.

2. Nevada v. Herrington, No. 85-7308. This action challenges the adequacy of U.S. DOE's siting guidelines under Section 112(a) of the NWPA (consolidated with EPI v. Herrington, No. 84-7854).

3. Nevada v. Herrington, No. 86-7307, challenges procedures used to nominate, recommend and obtain Presidential approval of sites for characterization.

4. Nevada v. Herrington, No. 86-7308, challenges the Secretarial decision to characterize Yucca Mountain without first obtaining Congressional withdrawal of land pursuant to Federal Land Policy and management Act.

5. Nevada v. Herrington, No. 86-7309, challenges the legal adequacy of the final Environmental Assessment for Yucca Mountain under Section 112(b) of NWPA.

6. Nevada v. Herrington, No. 86-7310, challenges the Secretarial preliminary determination of suitability under Section 114(f) of NWPA.

7. Nevada v. Herrington, No. 86-7311, challenges the Secretarial denial of funding under Section 116(a) and (b) of the NWPA for judicial review of Secretarial action under Section 119(a) of the NWPA. Oral argument was held on February 12, 1987, and the case is now under advisement.

RESPONSES TO QUESTIONS POSED BY SENATOR JAMES McCLURE

1. Is there anything we, as Congress, or that the Department, could bring to the nuclear waste disposal process, that would shift the focus away from the litigious confrontational bind we now find ourselves in, and towards a more productive and constructive avenue?

Response: This question poses an interesting distinction between the objective, scientific and technical resolution of problems and the political, legal and regulatory resolution of problems. It is noteworthy that the basic argument contained in most of the lawsuits filed against the Department of Energy assert the Department's failure to use the scientific, objective or technical approach. If Congress believes that the scientific and objective approach is the better one, and certainly it is the approach preferred by the Nuclear Waste Policy Act, then Congress should demand that approach of DOE as the states have been doing for several years.

The Department made its first major departure from the scientific approach when it elected to develop subjective siting guidelines. The current DOE siting guidelines are flawed from both a scientific and a logic perspective. The guidelines operate on the illogical premise that all sites and locations are considered suitable until the evidence proves that this is not the case. Not only does this faulty approach defy logic and sound scientific methods but it has the effect of shifting the burden of proof regarding the suitability of a given site from the Department to someone other than DOE, such as the State or the NRC. DOE uses the fact of a lack of (or paucity of) data as a tool to confirm the predetermined suitability of the existing sites. The Department compounded this problem by proceeding to select sites for characterization on the basis of political and ease-of-siting considerations (sites which were owned by the government in states with little political resistance capability), thereby assuring that its two preferred sites (Yucca Mountain and Hanford) were chosen for characterization.

The best way for Congress to bring the nuclear waste disposal program out of its litigious confrontational bind is to cause the program to be conducted in accordance with the law. In the event that Congress cannot or will not do that, the states' only remedy is in the courts.

Congress can begin to resurrect the program by directing DOE to develop new, objective and technically-scientifically base siting guidelines and then apply those guidelines in a truly objective site screening process as provided for in the Nuclear Waste Policy Act. Congress must also direct DOE to comply with the Act in all other respects including the requirement to identify potential second repository sites and the stipulation that the Department consult and cooperate with affected states and tribes. If Congress can see to it that DOE conducts a site selection program aimed at finding the best and safest repository site (not one that is only marginal or acceptable), and if that program is conducted according to impeccable standards of objectivity and scientific justifiability, the state ultimately found to contain such a site would find it very difficult to challenge the legitimacy of the selection process. However, as long as DOE is allowed to run roughshod over the Act's requirements for the pre-eminence of scientific and technical factors in site selection, the program will continue to be crippled by lawsuits and other forms of protest by states, tribes, interest groups and concerned citizens.

2. It is my understanding that C & C (Consultation and Cooperation) negotiations are now totally deadlocked. Could you provide the Committee with evidence that you have made good-faith efforts to sit down with the Department to hammer out a C & C agreement? How would you characterize these efforts to date? What would it take to bring you back to the table at this point?

Response: It is correct that the consultation and cooperation agreement negotiations are not moving. The reason for Nevada's reticence to negotiate a C&C Agreement at this time is that the Department has failed to deal constructively and honestly with Nevada, and has violated the statute. We see no valuable objective in spending time discussing details of program administration when there is such extreme disagreement on basic principles of the statutory compliance. On December 16, 1986, Governor Bryan communicated the State's position regarding consultation and cooperation to the Secretary. A copy of that correspondence is attached. DOE has, to date, shown no interest in negotiating the points raised in the Governor's letter.

3.a. The site characterization process is estimated to cost upwards of $1 billion in each of the three states under consideration for the first repository. Has your state considered the economic benefits that such a undertaking might provide?

Response: The State of Nevada is looking very carefully at the potential economic benefits and costs associated with site characterization. The fact that DOE estimates it will cost $1 billion to characterize the Yucca Mountain site, in no way means that the State of Nevada will realize substantial economic (i.e., monetary/employment) benefits. Indications are that very little in the way of site characterization benefits will accrue to the state or to local communities. DOE's own estimates indicate that, at most, 273 workers will be employed during characterization. That represents something like two tenths of one percent of the work force in the two-county area surrounding the site, assuming that all 273 jobs are filled by new workers. However, DOE expects that sixty percent (60%) of those 273 jobs will be filled by workers already employed at the Nevada Test Site. Consequently, the employment benefits of site characterization are so small as to be insignificant.

DOE has yet to provide the State with any information concerning other in-state expenditures that may result from site characterization (i.e., construction supplies, materials, services, etc.) despite repeated requests for such data. However, we assume that supplies, equipment and the like will be procured on a low-bid basis. It is very likely that most of the "benefits" resulting from such procurements will accrue to large suppliers, companies and organizations outside of Nevada simply because of existing economies of scale.

A great deal of the estimated $1 billion characterization costs can be expected to go to long-time DOE contractors located in other states. As a result, Nevada institutions can expect to see relatively very little in the way of technical or research dollars that might be available.

In summary, it has been DOE's policy to stress the potential economic advantages of site characterization (as well as subsequent construction and operation of a repository). In fact, DOE has not done an accurate assessment of the economic costs and benefits with regard to characterization. However, DOE's own conclusions, as reflected in the Environmental Assessment for the Yucca Mountain site and the Draft Socioeconomic Monitoring and Mitigation Plan, indicate that economic benefits to the State are likely to be insignificant or non-existent.

3.b. If what you claim about the technical flaws of yours site is indeed true, then wouldn't the best proof of that claim be the real, scientific findings that would result from such an undertaking? So you would win on two fronts" (1) substantial monetary and employment benefits to the State, and (2) scientific substantiation that your sites are unsuitable for nuclear waste disposal.

Response: As noted above, the relationship between site characterization work and economic benefits to the State or local communities is not likely to be significant. More importantly, the fact that DOE spends money on characterization activities does not automatically mean that crucial technical issues relative to the Yucca Mountain site will be answered -- or even adequately addressed. DOE has attempted to avoid addressing some of the more fundamental technical issues for years and has tried to prohibit the State of Nevada from conducting studies aimed at generating needed technical data.

An example of DOE avoidance of key suitability issues while forging ahead with expenditures of research funds at Yucca Mountain involves recommendations made by the National Academy of Sciences in 1979 relative to the potential suitability of tuff as a host medium for a repository. NAS advised DOE that five issues needed to be addressed before major resources are committed to a tuff site (such as Yucca Mountain). Those issues involved the seismic and volcanic stability of the site; lateral variation in thickness and character of the tuff; the fact that tuff terrains are typically broken by faults into blocks; the stability of tuff in the presence of elevated temperatures; and the presence of natural resources associated with tuff formations. Despite the expenditure of millions of dollars since 1979, DOE has yet to adequately address these key issues raised by the NAS. Given DOE's track record in conducting (or avoiding) site suitability investigations at Yucca Mountain, and the fact that the economic benefits to Nevada from characterization are likely to be insignificant (with major outlays of funds going to out-of-state contractors and suppliers), rather than "win on two fronts," Nevada is likely to be shortchanged in both instances.

4. Besides the influx of jobs and money directly associated with site characterization, what other socio-economic benefits would you consider as essential to your State's full cooperation in the site selection process?

Response: Nevada believes that it is currently cooperating fully in the site selection process. It is the State's role, as prescribed by the Nuclear Waste Policy Act, to monitor and oversee DOE's siting activities and assure that the conclusions drawn and decisions reached are appropriate and sound and that the health and safety of the citizens of the state are being adequately protected. Nevada has consistently striven to carry out that role.

Additional socioeconomic benefits for the State will not "fix" the site selection process simply because Nevada and the other potential host states are not the problem. The question infers that state "cooperation" to date has some how been lacking and economic "sweeteners" might promote less aggressive state oversight. The problem to date has been DOE's refusal to follow the letter and spirit of the Nuclear Waste Policy Act. In instance after instance, DOE has attempted to use the Act to ratify predetermined decisions. Had the Department heeded state's concerns over the inadequacy of the siting guidelines -- the first major decision document developed under the Act -- many of the current siting problems would have been avoided. If DOE had done a scientifically objective job of screening and ranking sites instead of manipulating the site selection methodology to assure that the Hanford and Yucca Mountain sites would be included in the top three sites, it would not now be accused of blatant mismanagement of the program. Likewise, if DOE had followed the letter of the law and not attempted to eliminate the second repository program for political reasons, the Department would not be accused of bringing the entire repository program to the brink of disaster.

Nevada has and will continue to fully cooperate in the repository siting program. However, the State cannot and will not, for the sake of economic benefits, roll over and abdicate its responsibilities to assure that DOE's work and decisions are adequate, legal and scientifically justifiable. Until such a time as a site is shown beyond doubt to be technically suitable, the question of economic benefits is and must remain superfluous.

5. In your opinion, would earlier, greater involvement by NRC and EPA help restore your confidence in DOE's program?

Response: Earlier and greater involvement by the Nuclear Regulatory Commission and the Environmental Protection Agency would have created better confidence in DOE's program, but only if both of those agencies were free to act as checks on DOE's program. There is a major institutional problem in assigning the mission function for the development of a major public works project with significant environmental implications to one federal agency while its sister agency (NRC) must measure the radiologic health and safety risk of the project and approve its construction. Only if the NRC is in a position to freely judge the proposal will public confidence be enhanced.

The NRC's evaluation and concurrence in DOE's siting guidelines is a case in point. NRC's staff certainly realized that objective siting guidelines would be preferable in developing information with which to evaluate the merits of competing sites. But the NRC commissioner's political deference to a sister agency within the same administration caused the Commission to concur in the guidelines notwithstanding their subjectivity. This institutional problem identifies a major state question with respect to NRC repository licensing. Will the Commission again defer to the political and institutional momentum engineered by its sister agency, the Department of Energy, if that department submits an inadequately supported application for licensing?

6. How would you characterize your relationship with DOE to date? What could be done to improve your ability to work with, communicate with, and provide advice to DOE?

Response: Nevada's relationship with DOE relative to the high-level waste program is difficult to characterize simply. In general, the state has enjoyed a fairly good working relationship with the DOE project office in Las Vegas. On numerous occasions, State officials and DOE/Nevada representatives have been able to work out agreements on difficult and potentially contentious issues, only to have those agreements vetoed by DOE/Headquarters personnel.

The State's relationship with the Office of Civilian Radioactive Waste Management (OCRWM) in Washington, D.C. has been considerably more negative. It is the State's contentions that DOE/Headquarters decision makers tend to view State-DOE relationships in a much more adversarial manner and see the State solely as an obstacle in the path of its repository program. DOE/Nevada officials, on the other hand, appear to understand and, in many cases sympathize with State issues and concerns.

An example of the divergent perspectives held by DOE/Headquarters and DOE/Nevada with regard to a key area of State concern involved the State's contention that it needed to conduct independent technical studies as part of its oversight function. State and DOE/Nevada officials were able to reach agreement on the State's proposed technical work and even signed a protocol allowing Nevada's activities to begin. However, the agreement was summarily vetoed by OCRWM headquarters staff, precipitating an extended legal fight which resulted in the affirmation of the State's right to conduct such studies. Had DOE/Headquarters followed its project office's advice and recommendations, a lengthy and unnecessary legal battle could have been easily avoided.

Nevada believes that much of the difficulty that now exists in the relationships between DOE and the states could be eliminated if DOE project offices were given more authority and latitude in addressing state concerns. DOE Headquarters officials informally state that they expect state/DOE relationships to be constantly and predictably adversarial, and that states are bent on derailing the repository program. Given that attitude and the fact that more and more programmatic authority is being centralized in Washington, D.C., Nevada does not expect that more effective or meaningful Departmental consultation or cooperation will be forthcoming in the foreseeable future.

7. Have any of you taken the time to study the process by which the State of New Mexico negotiated and implemented than version of a "C & C agreement" with DOE for the waste disposal activities taking place at the Waste Isolation Pilot Project near Carlsbad, New Mexico? Have any of you visited the WIPP facility, or talked with the state government and environmental representatives in New Mexico to learn from their experiences?

Response: Nevada has indeed studied the process by which the State of New Mexico negotiated and implemented its version of a C&C agreement for the Waste Isolation Pilot Project. You may recall that agreement was written as a stipulated resolution of a lawsuit. It was not written because of the willingness of the federal government to cooperate with the State of New Mexico. From the beginning, its execution was not wholly satisfactory to the State of New Mexico, and subsequent litigation was necessary to resolve additional issues upon which the federal government and state did not agree. The State of New Mexico is continuing to assert its dissatisfaction with DOE's interpretation of the agreement with respect to transportation issues.

Nevada has worked closely with representatives of New Mexico's Environmental Evaluation Group (EEG). In fact, Nevada transportation representatives are, at the present time, working with New Mexico officials in an attempt to require DOE to adhere to the letter and spirit of the New Mexico C & C agreement governing the transportation of waste to the WIPP facility. As it has done with regard to the Nuclear Waste Policy Act, DOE is attempting to interpret the New Mexico agreement to suit its (DOE's) own purposes and is reneging on commitments relative to transportation issues and to the application of EPA performance standards to the WIPP facility.

Nevada does not view the DOE/New Mexico C & C agreement as a model accord for a potential repository state. The New Mexico agreement was not something the state entered into willingly or as a consequence of its rights under law. The agreement represents the best New Mexico could do under a very difficult set of circumstances wherein DOE was able to ride roughshod over state concerns and interests until a court decision finally gave New Mexico a certain amount of leverage.

Nevada views its role under the Nuclear Waste Policy Act as significantly different from and more substantial than New Mexico's role vis-a-vis the early days of the WIPP project. Consequently, any C & C agreement (or even the negotiations needed to reach such an agreement) must be based on a mutual acknowledgement of the importance and substance of the state's rights and responsibilities under the NWPA.

8.a. Most of you have read GAO's draft report on "Institutional Relations." This report was done at the request of this Committee, and should be available in final form by the end of this week. What is your opinion about the conclusions and recommendation in this report?

Response: We believe that the conclusions and recommendations made by the GAO are a good first step to improve institutional relations between the states/tribes and the Department. However, they fall short of really attempting to define the problem and make significant recommendations. The conclusions and recommendations are focused on the symptoms of the problem rather than the problem itself. Additionally, the attempt to characterize the concerns of the states and tribes as dissatisfaction and disenchantment grossly understates these concerns.

8.b. If the recommendations in this report were implemented, would this significantly improve the prospects for success of the Program?

Response: The recommendations contained in this report, if implemented, would do little to improve the prospects for the success of the program in that the GAO fails to recognize and address the fundamental underlying problem with the program.

It is Nevada's contention that the finely crafted relationship established between DOE and the states in the Act has not been fully realized, and that this situation threatens to render the purpose and framework of the Act inoperative. We further contend that the cause of this failure rests strictly with the Department of Energy and stems directly from DOE's inability or unwillingness to understand the fundamental nature of the state/federal (i.e., DOE) relationship under the Act. For whatever reason, DOE has chosen to pursue its role as program decision maker with relish -- as it has every right and responsibility to do. However, at the same time, the Department has attempted, at nearly every opportunity, to thwart the states' efforts to fully exercise their obligations as guardians of the public interest. Unless balance is restored and restored quickly to this critical relationship, DOE will find itself in a situation where it is unable to develop the level of public confidence essential to success in this controversial undertaking.

What DOE has failed to grasp in over four years of NWPA operation is states such as Nevada do not exist simply as obstacles in the path of its repository program. We have a role to play that is every bit as crucial as DOE's. While state relationships with DOE are and should be adversarial, it is only out of this adversity that a firm basis of public confidence in DOE's handling of the waste program can emerge.

DOE's waste management actions and decisions since 1983 present very clear evidence that the Department has never grasped the significance of the states' role in furthering the Department's own interests and purposes under the Act.

From the beginning, the Department has attempted to frustrate state involvement in the siting process. In developing its guidelines for siting high-level nuclear waste repositories, DOE engaged in an elaborate exercise wherein states' input was solicited only to be disregarded when it did not coincide with preconceived DOE decisions about how the site selection process should be handled. The result was a set of siting guidelines that are overly subjective and which failed to adequately discriminate between potential sites when applied in the various Environmental Assessments. Had DOE heeded state concerns about the guidelines early on, it would not have been faced with a situation where it was trying frantically to build objective technical measures into a set of standards that are inherently flawed. Instead, DOE now faces litigation by numerous states and interest groups relative to the adequacy of the guidelines.

The Draft EA's themselves are another example of DOE intransigence when it comes to state involvement in key decision areas. Nevada and other states consistently asked DOE for nearly two and one-half years for the opportunity to participate in the development of the Draft EA documents, especially in the design of the ranking methodology that would be used to discriminate between sites. DOE steadfastly refused to allow states the opportunity to influence the form or substance of those documents until they were issued in draft form and until DOE was already so committed to decisions relative to content, methodologies, and the like that it was unable to give more than lip service to state concerns as finally expressed in formal comments. The result -- environmental assessments that are inadequate for substantiating DOE claims relative to site suitability and which bind the Department into an inflexible and extremely limited view of the various sites under consideration. Instead of public confidence and acceptance being enhanced by the EA's - DOE is left to defend a set of decision documents that are themselves objects of skepticism and public derision.

DOE's management of the nuclear waste fund has likewise been aimed at limiting, whenever and wherever possible, state access to funds needed to fully carry out NWPA responsibilities. DOE's performance in this regard is especially reflective of how the Department has approached other key aspects of the repository program. Simply put, DOE interprets the Act according to its own interests regardless of the intent of Congress or even the letter of the law itself. The recently decided lawsuit brought by Nevada over the State's right to use waste fund monies to conduct independent, confirmatory studies relative to site suitability is an excellent example of this DOE "stonewalling" strategy. Ignoring the language of the Act and the obvious intent of Congress that potential repository states be able to engage in reasonable studies and other activities to assure that DOE's conclusions about the suitability of sites are, in fact, accurate, DOE issued a set of internal policy guidelines that expressly prohibited states from conducting any such independent analyses. When the Ninth Circuit Court of Appeals clearly decided the matter in Nevada's favor, saying unequivocally that "because DOE's guidelines seek to 'minimize' independent collection of primary data, and require DOE approval before any federally funded tests can be run on the primary data that DOE has collected, they undermine the independent oversight role that Congress envisioned for the states," DOE immediately attempted to again thwart Nevada's efforts by issuing new "Guidelines" that require new and different hoops for the state to jump through. Meanwhile, the state falls further and further behind in its ability to oversee DOE technical efforts relative to the Yucca Mountain site, and the public is left with the indelible impression that DOE has something to hide -- that it fears its technical work and conclusions will not stand close scrutiny.

As I pointed out earlier and as the examples I've cited demonstrate, the DOE approach to implementing the NWPA has been to interpret the Act only in ways that support pre-Act siting decisions and to limit and interfere with the role prescribed for potential repository states. What DOE has failed to grasp is the essential element of mutuality between DOE and these states. Nevada contends that the Act and DOE will be successful only to the degree that the states are successful in carrying out their role as overseers and custodians of the public interest. DOE and potential host states may be adversaries, but we are both necessary for the success of the repository program.

THE STATE OF NEVADA
EXECUTIVE CHAMBER
Carson City, Nevada 89710

RICHARD H. BRYAN
Governor

TELEPHONE
(702) 885-5670

December 16, 1986

The Honorable John S. Herrington
The Secretary of Energy
U.S. Department of Energy
Washington, D.C. 20585

Dear Mr. Secretary:

I have reviewed Mr. Fusche's November 19, 1986 letter seeking to enter into a binding written agreement with the State of Nevada pursuant to Section 117(c) of the Nuclear Waste Policy Act, 42 U.S.C. 10137(c). His letter proposes commencement of negotiations with a "team" of Department of Energy personnel headed by Mr. Don Schueler, Deputy Manager of the Nevada Operations Office.

I believe that the concept of the development of a written agreement between an affected State, such as Nevada, and the Department of Energy, as originally envisioned by Congress, has considerable merit and Congress should be commended for their foresight in this regard. However, I do not believe that Congress or any of the affected states envisioned that the Department of Energy would have acted irresponsibly and illegally in implementing the Act as has now become so apparent.

As you know, I, along with the Attorney General and the entire congressional delegation have filed actions challenging the legality of nearly every major decision that the Department has made in this program. These challenges are supported by a broad spectrum of the citizens of Nevada. These actions challenge the validity, as well as the legality, of this program,

and to the extent that they are successful, major program decisions regarding site selection that you have made may be declared null and void and the entire siting process restarted. This may include the development of new siting guidelines, rescreening for potentially acceptable sites, the development of new environmental assessments, and restarting the second repository program.

Given the way in which the department has implemented the Act, it is now impossible for the State of Nevada to have confidence or trust in any negotiations with the Department of Energy regarding the implementation of the balance of the program until the uncertainties surrounding the aforementioned concerns are resolved by the courts, Congress or by the Department.

To the extent that our concerns regarding the legality of the siting guidelines, the site selection process, the environmental assessments and the timing of the preliminary determination of suitability required by Section 114(f) of the Act and the second repository program are negotiable, then perhaps discussion regarding a possible written agreement may be appropriate, and I'd appreciate your consideration of those matters.

Additionally, the manner in which the Department of Energy has treated the State of Nevada in attempting to consult and cooperate, as required by the Act, has compounded this situation. The Department has conducted its grants application process in an arbitrary fashion. As you know, Nevada has been forced to seek review by the courts of the way in which the Department has used the grants process to limit the State's participation in the program, and it appears that, even though the court ruled in our favor, we now may be forced back to court over our current grant application.

This lack of cooperation also diminishes our confidence that the Department would honor the terms of a written agreement any more than it has lived up to the statutory requirements of the Act. Should the Department be sincerely interested in consulting and cooperating with the State of Nevada, it can demonstrate that commitment by fulfilling our grant request without the continuing difficulties which has been present in nearly every one of our past, as well as our current, grant requests.

I'd appreciate your consideration of these concerns, and I would be happy to provide any further information you may require. Robert Loux, Director of State Nuclear Waste Project office will be available to discuss our concerns with Mr. Rusche or Mr. Schueler at any mutually convenient time.

Sincerely,

RICHARD H. BRYAN
Governor

RHB/dkl

cc: Mr. Ben Rusche
Mr. Don Schueler
Mr. Grant Sawyer

YAKIMA INDIAN NATION RESPONSES TO QUESTIONS OF THE SENATE COMMITTEE ON ENERGY AND NATURAL RESOURCES

March 17, 1987

Questions from Senator McClure

QUESTION

1) By the very nature of our political process and our democratic structure, our society tends to depend more on the legal procedure, the hearing, the regulation, and the lawsuit, than it depends on the science, the technology, or the actual physical process of working through a problem. (Witness over 30 lawsuits now pending against DOE concerning the Nuclear Waste Program.)

Is there anything that we, as Congress, or that the department, could bring to the nuclear waste disposal process, that would shift the focus away from the litigious, confrontational bind we now find ourselves in, and towards a more productive and constructive avenue?

RESPONSE

We disagree that the focus is on a "confrontational and litigious basis." Litigation is the method provided in the Nuclear Waste Policy Act ("NWPA") to secure independent review of the actions of the Department of Energy under the Act. Section 119 of the NWPA provides for review of the Administrations actions sought by the Yakima Indian Nation. We believe that Congress in its oversight is able to determine that the Department of Energy has not fulfilled its responsibility to affected first round states and tribes as Congress directed. Congress of course can, and probably will, give the Department of Energy direction. This would limit the need for litigation. The Yakima Indian Nation resents that it has to advance its limited funds to secure such compliance. We do not wish to be in litigation. It is our only method we find available to us to fulfill our responsibility under the NWPA. While we must continue this litigation until Congress or the President brings the Department of Energy into compliance with the NWPA, we continue to directly seek DOE's respect for Congressional directed consultation and cooperation responsibility of the Yakima Indian Nation

In developing the consultation and cooperation concept included by Congress in the NWPA, a real need based on the past actions of DOE was shown. Congress wanted to change this improper method of operation. In fact one of the original concepts was that of consultation and concurrence. The idea was that the federal government should work with key governmental entities, such as the states and tribes and that concurrence authority should be provided in regard to the location of national repositories. This resolved through compromise from an absolute veto into the consultation and cooperation concept contained in the NWPA. The ultimate authority was enacted on the premise that the federal program might overlook key issues in its technical analysis in determining site suitability, and a State or Tribe should have an opportunity to indicate and resolve these insufficiencies, which would invalidate the suitability of the site selected for development of a repository. Legislative history shows considerable and reasonable concern on the part of Congress regarding DOE's lack of concern regarding public and local interests. The present status regarding the selection of such a repository, shows that Congressional concern was well placed.

The problem is greater than the present controversy. If the Department of Energy persists in its present tactics, the disposal of high-level nuclear waste in a geologic repository will be delayed or might fail. This danger might be substantially reduced--if not completely avoided--if the public had grounds for confidence that the program will actually result in suitable disposal of radioactive wastes. That confidence is now completely lacking, due to a fundamental difference in attitudes about the problem. Placing so much emphasis on the unrealistic schedules in the NWPA, displayed an undeservedly optimistic attitude about the radioactive waste disposal problem. In particular, those aspects of the schedule which have been interpreted as an indirect endorsement of the poor candidate sites for the first repository DOE had selected prior to NWPA passage, have had very profound and negative effects on the credibility of the program. Similarly, DOE's attitude that it need not find the best site, but rather only a "suitable" one, and that there need only be one suitable site remaining at the conclusion of site characterization, also display unseemly optimism about the likelihood of success in this program. These attitudes are simply not what we believe Congress intended when they enacted the NWPA and we seek means to determine this intent.

These attitudes contrast sharply with the attitudes of the Yakima Indian Nation, other affected parties, and the general public concerning radioactive waste disposal. The public simply does not accept the notion that there are no significant technical difficulties in the way of successful disposal, or that virtually any site DOE may choose can be shown to be suitable. This is particularly true regarding sites such as Hanford that were selected on the sole basis that they were within an already established nuclear reservation. Even if basalt and the Columbia Plateau were a gracious host for this radioactive material, no one with any regard for the ground water flow problem would place it so close to two of the major rivers in this vast basalt bed.

We believe this public skepticism about DOE's execution of its responsibility under the NWPA is entirely correct and justified, but for purposes of achieving successful, acceptable disposal, it does not really matter whether the skepticism is correct or not. As long as the program continues to be implemented in such a non-conservative manner, and continues to violate such common sense ideas as the need to avoid fractured, saturated rock, rivers, towns, lakes, major aquifers, earthquake faults, parks, natural resources, etc., the public perception of the program will continue to deteriorate, and confrontation and litigation will abound. We believe that all these common sense problems could be avoided by sites within the United States using a properly conservative approach to site selection. The public's justified uneasiness about the program will never be quelled as long as it is so apparent that DOE is making no effort to avoid these common sense problems and find a truly excellent site.

The Yakima Indian Nation feels strongly that the NWPA provided means to have the federal government and affected governments jointly assess the process, procedures and issues in the selection of a suitable repository. Congress can reaffirm its desire to have the NWPA implemented as it intended. There was substantial wisdom in calling for a consultation and cooperation process. Unfortunately, it appears that the Department of Energy has mis-interpreted both the letter and the spirit of such legislation. A reaffirmation by Congress, that it supports and expects DOE to follow the act as regards meaningful participation would assist in redirecting their effort in a positive way and hopefully would make it unnecessary for us to advance funds for litigation. At present, litigation remains the only viable option.

QUESTION

2) It is my understanding that C&C (consultation and cooperation) negotiations are now totally deadlocked. Could you provide the Committee with evidence that you have made good-faith efforts to sit down with the Department to hammer out a C&C agreement? How would you characterize these efforts to date? What would it take to bring you back to the table at this point?

RESPONSE

C&C negotiations between the DOE and the Yakima Nation are not totally deadlocked. The Yakima Indian Nation initiated the first negotiations in order to provide specific means by which the Yakima Nation could measure and review program actions by the DOE and determine the sufficiency of the federal program. We discovered very early in such negotiations, that we were not prepared to take the leadership above all other interested states and tribes. It was decided to suspend the negotiations pending the completion of the ongoing DOE-Washington State negotiations. This decision was a wise one, because we are now in a better position to negotiate a suitable agreement. At the beginning we believed that the DOE would follow the NWPA and totally determine its recommendations on science and technology. After all, DOE like the rest of the federal government has a trust responsibility to the Yakima Indian Nation.

DOE's early actions dispelled a large portion of this trust and the actions of May 28, 1986 totally destroyed it. Our negotiations will take a more realistic tack. The Yakima Indian Nation continues to be serious about the possibility of negotiating a satisfactory C&C agreement. We have gone back to the very beginning and are currently assessing the issues that will result in the active continuance of the instituted negotiations. We do not discount the difficulty in negotiating an agreement when the other party has shown a complete lack of concern for our interests. In reality the only good agreements are ones that can be based on such mutual trust where a mere handshake would suffice and the written agreement only records the agreement to decrease misunderstanding and change of participants. We do not believe that such an agreement will be the result of the our negotiations but believe that we can accomplish mutual interests by the institution of some binding conflict resolving mechanism.

QUESTION

3) The site characterization process is estimated to cost upwards of $1 billion in each of the three States under consideration for the first repository. Has your tribe considered the economic benefits that such an undertaking might provide.

Furthermore, if what you claim about the technical flaws of your sites is indeed true, then wouldn't the best proof of that claim be the real, scientific findings that would result from such an undertaking? So you would win on two fronts: (1) substantial monetary and employment benefits to the tribe, and (2) scientific substantiation that your sites are unsuitable for nuclear waste disposal.

RESPONSE

The history of large construction projects near Indian reservations indicates they rarely produce significant economic benefits for tribal members. The many large projects already built at Hanford have had little benefit for members of the Yakima Indian Nation. There are few, if any, hard rock miners in the Tribe. Moreover, few tribal members would be interested in working in such a contaminated place. Even if we were to get our fair share of the "pork" resulting from site characterization, we believe that supporting a waste of these funds is irresponsible. There are many worthwhile projects in this area that are delayed because of lack of funds.

While we fully expect that attempts at characterization of the Hanford Site would confirm our impressions about its technical unsuitability, that does not necessarily lead to a conclusion that characterization of the site is in the interest of the Yakima Indian Nation or the United States. For one thing, there is serious question whether the site can be characterized at all. The excavation of such large shafts in highly stressed, saturated basalt has never been demonstrated. Moreover, the contemplated characterization work--sinking of one or two exploratory shafts and mining of a few horizontal drifts--might not result in the necessary understanding of the Hanford Site. Because of the density of the rock and the apparent heterogeneity of the deep basalts at Hanford, prohibitive anomalies might be just beyond the mined areas, but DOE might still be unable to detect them.

The likelihood of ending up with a technically and publicly acceptable site for a repository is seriously threatened by DOE's stubborn insistence on characterization of a site with so many indications of unsuitability. It is important to note that technical criticisms of the Hanford Site have come from many quarters besides the states and tribes, including USGS, NRC, many independent earth scientists, and even DOE's former BWIP Geology and Hydrology Oversight Committee. Spending billions of dollars and the better part of a decade in pursuit of the worst possible site squanders not only money and time but also the possibility of confidence in the program.

Another serious threat to YIN interests that could result from characterization of Hanford is the possibility that DOE may be forced to choose it in spite of poor technical suitability because of extraneous problems with the other candidates. For example, if we end up with only one repository for the country, there is a distinct possibility that faults bounding the Yucca Mountain rock body may make it too small to accommodate all of the waste. The Texas site is fairly widely viewed as a political impossibility for development as a repository, and also apparently has serious technical concerns about salt creep and protection of the Ogalalla Aquifer.

If characterization of Hanford does not prove to be utterly impossible, it is not difficult to foresee a scenario that would result in enormous pressure to go with Hanford, which has been DOE's most administratively convenient candidate for a decade, in spite of serious continuing technical problems. DOE's blindly optimistic attitude about this program, discussed above, and supreme stubbornness in continuing to pursue the Hanford Site in spite of its own admission that it is the worst site, make such a scenario seem not at all unlikely.

Finally, site characterization is not without its impacts. The water and soil coming from this site that contain both radioactive and toxic materials will have a more ready access to the environment. We just don't want this material to flow, blow or otherwise be carried to our fisheries or to our close-by reservation.

QUESTION

4) Besides the influx of jobs and money directly associated with site characterization, what other socio-economic benefits would you consider as essential to your tribe's full cooperation in the site selection process?

RESPONSE

The Yakima Indian Nation has been participating and cooperating fully in the site selection process for more than four years. It is in our interests to do so, and we require no "incentives" to procure our cooperation. We accept the responsibility that Congress placed on us under the NWPA and will continue to fulfill it for the benefit of all.

Your very question gives us concern. It is continually suggested by DOE that buying one's way to a site may be the ultimate solution to the site selection problem. We do not believe that this is the way to select a site. The best site should be selected. Not just a site that is suitable and one that has been greased by the receipt of federal funds.

QUESTION

5) In your opinion, would earlier, greater involvement by NRC and EPA help restore your confidence in DOE's program?

RESPONSE

Yes. In particular, we sincerely wish that the NRC would abandon its "hands off" approach to DOE's site selection process. The Commission has unfortunately instructed its staff not to interfere in DOE's site selection. Consequently, serious NRC Staff reservations about some of the sites have been consistently soft-pedaled in NRC's comments on DOE's studies. Also, while the Commission initially insisted on a meaningful interpretation of the timing of the preliminary determination of suitability--i.e., that it should be made following characterization--it later retracted that insistence, thus acquiescing in DOE's complete emasculation of that provision of the NWPA. This unseemly deference to DOE's mistakes on the Commission's part is a great disservice to the likelihood of success in the program.

Greater forthrightness in presenting NRC and EPA concerns are necessary, but not sufficient, conditions for greater confidence in the program. Also necessary is for DOE to start heeding the concerns of these agencies. For example, NRC has now expressed its serious reservations about the validity of DOE's groundwater analysis for the Hanford Site on at least three formal occasions. DOE has neither heeded the Commission's suggestions, nor adequately explained its refusal to do so. The Department is delinquent in dealing with the concerns of its fellow agencies.

QUESTION

6) How would you characterize your relationship with DOE to date? What could be done to improve your ability to work with, communicate with, and provide advice to DOE?

RESPONSE

The relationship between the YIN and the Richland Operations Office of DOE has been fairly good, as far as our ability to communicate with key liaison persons is concerned. Our relationship with DOE Headquarters is less than satisfactory. The basic problems that must be addressed are the difficulty and length of time it takes to get information from DOE, the general failure of DOE to consult with us prior to the development of hardened DOE positions, repeated inadequate notice of important meetings, and failure to adequately deal with our and other parties' substantive concerns. The YIN takes its consultation and cooperation role very seriously. When DOE begins to take it seriously, our ability to work with the agency will be much improved.

QUESTION

7) Have any of you taken the time to study the process by which the State of New Mexico negotiated and implemented their version of a "C&C agreement" with DOE for the waste disposal activities taking place at the Waste Isolation Pilot Project near Carlsbad, New Mexico? Have any of you visited the WIPP facility, or talked with the State government and environmental representatives in New Mexico to learn from their experiences?

RESPONSE

In the New Mexico WIPP experience, it appears that necessity resulted in DOE's acquiescence in a de facto institutionalization of the state's role which the agency has thus far not evidenced a willingness to grant affected states and tribes under the NWPA. Yakima Tribal Council Chairman Melvin Sampson toured the WIPP facility in 1984 as a member of then-Secretary Hodel's Advisory Panel on Alternative Means of Financing and Managing Radioactive Wastes.

We have discussed the New Mexico C&C experience with New Mexico participants and have attended several panels where their experience was related. This information is part of our C&C program.

On our request, New Mexico was kind enough to furnish technical representatives to meet with us on an individual basis. We appreciated this cooperation and learned from this contact.

QUESTION

8) Most of you have read GAO's draft report on "Institutional Relations". This report was done at the request of this Committee, and should be available in final form by the end of this week.

a) What is your opinion about the conclusions and recommendations in this report?

RESPONSE

In general, the YIN supports the conclusions and recommendations in the final GAO report. We particularly note two aspects of the report: first, the response DOE gave concerning its refusal to involve outside experts in application of the site ranking methodology, as urged by the NAS. DOE told GAO that "the partisan participation of states and tribes at that point would have been distracting." (GAO/RCED-87-14, p. 41) This comment strongly evidences the general DOE attitude referred to above: that the states and tribes are always partisan, therefore "distracting," therefore to be disregarded.

Second, the GAO report touches on the differences in attitude between DOE and the states and tribes. DOE is optimistic about the ability to succeed; states and tribes are skeptical. It is important to note that the states and tribes are simply reflecting the attitudes of the majority of their citizens. As long as those citizens, acting through their state and tribal governments, see DOE constantly eschewing conservatism in its evaluations, they will not trust DOE. As numerous other recent GAO reports have shown, DOE has given the public no reason to trust its judgment concerning stewardship of the environment at its facilities nationwide. This poor track record-- particularly at the Hanford Site--has a great deal to do with the present skepticism of the YIN and other members of the public.

In discussing its suggestion for increased use of independent advisory groups, the GAO report notes, "Without the involvement of such groups, states and tribes have to rely on DOE's judgment or assertions, which they distrust." We strongly affirm this conclusion, and support the recommendation that meetings or discussions between any independent parties and DOE should be open to state and tribal participation. We are pleased that this report is finally being released. We have requested its release.

QUESTION

b) If the recommendations in this report were implemented, would this significantly improve the prospects for success of the Program?

RESPONSE

The GAO's recommendations, if implemented, would be helpful. However, we believe they are deficient in not recommending more meaningful DOE responses to the substantive concerns of tribes and states and other federal agencies. DOE must either accede to our substantive comments or give adequate reasons why it does not do so. "We still think ..." is not an adequate response.

The recommendation for employment of independent advisory groups should explicitly include complete participation by the states and tribes. For DOE to come to us with completed studies and plans that have already been approved by NAS or any other independent body--as they did with the site ranking methodology-- is worse for meaningful consultation and cooperation than having no independent oversight at all.

Finally, while we do not rule out the possibility altogether, we share the concerns expressed by others about negotiation of incremental C&C agreements. Some basic issues must be resolved and a method for resolving future controversy must be in place.

STATE OF WASHINGTON

RESPONSES TO SENATOR BENNETT JOHNSTON QUESTIONS

State-DOE Cooperation

1. Do you believe your state has made a good faith effort to cooperate with the U.S. Department of Energy? Describe the contacts with USDOE that you initiated. What were the results?

The state of Washington has attempted in good faith to consult and cooperate with USDOE to the full extent allowed under the Nuclear Waste Policy Act. It is very clear that we and USDOE have widely divergent views regarding the "consultation and cooperation" (C&C) provisions of the Act.

The state of Washington, in July 1983, contacted USDOE to begin C&C negotiations. After more than 18 months of good faith negotiations, the parties were unable to resolve serious issues such as water rights, transportation, emergency response, defense waste, foreign waste, work suspension, liability, and other issues. The state became convinced that the C&C process was not effective when we successfully used NWPA Section 117(b) Governor's letters to obtain positive results in the areas of water rights and defense wastes. These issues had been the subjects of intense C&C negotiations. Attachment #1 is the state of Washington report to Congress on C&C negotiations without significant progress. This report reviews past actions, assesses the current situation, and summarizes reasons why an agreement has not been signed.

Governor Gardner's February 4 statement to your committee (Attachment #2) reviews how the state of Washington attempted to report serious technical concerns to USDOE. The statement also documents how USDOE decision-makers ignored the ranking conducted by USDOE's own scientists and contractors and chose the most costly and least safe site for characterization. As a result, USDOE credibility is at an all time low and the site selection process is on the brink of total collapse.

In our reading of the Act, affected states and tribes are provided a unique oversight role which in turn requires that we be involved early and in a meaningful manner in key decisions and activities. Such a C&C approach would allow these affected parties an opportunity to influence USDOE policy and direction. USDOE, after four years of trying to implement the NWPA, is unwilling or unable to allow early and meaningful involvement by the states and tribes in the decision-making process. USDOE selects a course of action and then asks for our recommendations and comments. We are asked to provide them comment on draft documents and policies when in reality USDOE has already committed to a decision.

USDOE's approach toward less than meaningful cooperation appears to be a product of senior management within USDOE headquarters. The Richland Operations BWIP group and their contractors have attempted to cooperate, but have also been victims of narrow headquarters approach. For example, in May of 1986 we were asked to provide comments and recommendations on the Hanford Environmental Monitoring and Mitigation Plan (EMMP) and the Hanford Socioeconomic Monitoring and Mitigation Plan (SMMP). We did respond with timely and substantial comments. Our major comments had to do with the need to understand the amounts and locations of contamination from defense operations so such contamination would not be further dispersed during site characterization. Hanford personnel understood our concerns and asked a contractor to prepare preliminary draft reports which included our comments and concerns. This report then went to headquarters. They responded by instructing BWIP and the contractor to delete the information related to our specific concerns. Attachment #3 is a copy of a letter which documents the USDOE actions.

2. Do you believe that USDOE has made a good faith effort to cooperate with your state? Describe the contacts with you that were initiated by USDOE. In these cases, what were the results?

USDOE's efforts to cooperate with the state of Washington have not met the standards established in the Nuclear Waste Policy Act. In my opinion, USDOE has not moved out of the darkness and secrecy of the 1954 Atomic Energy Act into the sunshine provisions of recent acts such as NWPA and RCRA.

USDOE initiated contacts are usually characterized by a few common traits. Meetings are scheduled with little notice and often the meeting date conflicts with other important meetings. Meeting agendas are not specific, so interested parties have trouble determining whether it is a significant or trivial meeting. A few days before, and sometimes a day after the meeting, the interested parties receive large stacks of paper. Again it is difficult to separate the significant from the trivial. Meetings are dominated by viewgraph presentations which overstate agreements and understate problems.

Early on it became apparent that contracts initiated by USDOE had not provided early and meaningful involvement. In early 1985, states and tribes learned that USDOE had established coordination groups to coordinate the efforts of headquarters, project offices and contractors in key areas such as quality assurance, transportation, environmental quality, etc. It appeared the coordination groups were discussing important technical and policy issues while the issues were in an early development stage. The states and tribes suggested that the coordination groups would provide a forum where our ideas, concerns, and perceptions of each key area could be shared with USDOE and its contractors. We recognized that USDOE was accountable for final decisions. We only wanted the decision makers to be aware of our views before decisions were made. After considerable discussion and delay, USDOE reluctantly agreed to our participation.

Soon after the states and tribes began attending the meetings, the substance and the format of the meetings changed. Smaller working groups were established, but states and tribes were not invited to participate. The meetings changed to characteristic viewgraph show and tell presentation.

Site-Specific Technical Issues

1. What do you consider the most important technical, scientific or engineering reasons why your site is inappropriate for a repository?

There are four distinct adverse conditions at Hanford which we consider most significant, unfixable and cause for immediate disqualification of the site. They are, roughly in order of importance:

- Groundwater travel time and the uncertainty in its calculation;
- Natural, unequal, internal stress in the basalt which can lead to induced rock failures;
- Lack of retrievability;
- The presence of methane gas, whether or not it is commercial today.

Groundwater Travel Time

In November 1982, USDOE issued its Site Characterization Report which reported a far more optimistic finding than the facts could support. USDOE assumed that groundwater traveled under the Columbia River and discharged into the Columbia River near Wallula

Gap. USDOE estimated a 30,000 to 41,000 year travel time to a 10 kilometer accessible environment. The state of Washington, the affected tribes, NRC, and USGS all strongly disagreed with the estimate. USDOE's estimate simply did not stand up to outside scrutiny.

Early travel time estimates did not stand up to scrutiny because USDOE misinterpreted Hanford geology and hydrology. Between the Hanford repository horizon and the accessible environment there are numerous basalt lava flows, generally becoming thinner at shallower depths. Between these flows are porous, permeable sandy sediments known to be able to transport groundwater over long distances. Although parts of the large basalt flows transmit groundwater slowly, other parts of the same flows transmit groundwater by up to six orders of magnitude (1,000,000 times) more easily. The total range of values in individual flows alone may span more than 13 orders of magnitude if sediments are part of the groundwater system.

Where there are continuously adjacent zones of high conductivity leading to the accessible environment, groundwater will flow preferentially along the path of least resistance at the highest rate within the parametric envelope of values. Simply stated, if there is a hole in the bathtub, the water will run out. The great variability in individual flow rates makes it very difficult if not impossible to determine accurate flow rates for the repository as a whole. Although median or mean groundwater travel times may seem to indicate possible compliance with standards, the associated uncertainties cast significant doubt on the "actual" or real travel times.

The state of Washington believes that calculations, which use current USDOE hydrology data and a reasonable range of effective porosity values, will indicate a very significant likelihood that Hanford cannot meet the 10 CFR 60 groundwater travel times. The Hanford site should be disqualified on this basis alone.

Internal Stresses

The Hanford basalt flows are under great stress from natural forces, and these forces are unequal. There are cases where the basalt, which is strong but brittle, fractures spontaneously when confining forces are removed. Therefore, in situ (in-place) stress level is a critical element in repository design. Slight increases in in situ stress translate to large increases in waste package spacing with a corresponding increase in the volume of rock removal. The costs associated with a volume increase are great.

Rockbursts, which are associated with high in situ stresses, are expected to result in high numbers of worker injuries and fatalities. The Lucky Friday mine in Mullen, Idaho, also has a high in situ stress situation similar to the BWIP repository horizon. Mining operations were recently shut down because of injuries and the loss of life associated with rock burst accidents. Actual mining conditions in USDOE's proposed very deep and very large mine would be both dangerous and debilitating to workers. The natural rock has a temperature of 120-140 degrees Fahrenheit, and the ambient temperatures will increase if waste is emplaced. Relative to other sites or mines, heroic measures must be taken in both ventilation and rock stabilization. USDOE estimates that there would be significantly more injuries and fatalities at Hanford than any other site under consideration.

USDOE recognizes that Hanford conditions are inherently more dangerous than other underground mining operations. Miners will have to be drawn from a select population and especially conditioned in order to work under the very hot, humid conditions. Even though actual work hours would be constrained, miners under constant physical stress are prone to errors in judgment. Adverse working conditions will result in high pay premiums for the miners.

The hard and brittle nature of basalt, the adverse working conditions, and the resulting constrained work hours are a few of the reasons for the constantly escalating costs for the BWIP project. In December 1984, USDOE estimated a basalt repository would cost $7 billion in 1983 dollars. In May 1986, the cost had escalated to $12.3 billion, and costs will continue to escalate

USDOE management deleted from the May 1986 Multiattribute Utility Analyses Report the following passage addressing uncertainties and costs:

> *"The stability of the base-case results were tested by extensive sensitivity analyses. The relative rankings obtained in the base case is almost completely insensitive to any changes in the technical or value judgments, except for costs. If one could argue that the costs associated with the Hanford site would somehow decrease while the costs for all the other sites would increase, then the Hanford site could be competitive. The probability of this with regard to transportation costs is obviously extremely low since Hanford is the farthest site from the sources of waste. The probability of this scenario with regard to repository costs is more uncertain, given the uncertainty in site conditions and consequently repository design prior to the sinking of exploratory shafts. Several experiences with salt and some at-depth experience in tunnels near Yucca Mountain under conditions*

> *similar to those expected at Yucca Mountain make the scenarios also unlikely with regard to repository costs. For example, the basalt at Hanford is much harder than the other rock types under consideration, requiring labor-intensive, low-productivity mining techniques. The depth, stress conditions, high temperatures, potential for large groundwater inflows at repository depth, coupled with almost no or little underground construction experience, all contribute to the high repository cost estimates. These conditions do not appear subject to great change."*

From this passage it is clear that USDOE scientists and consultants agree with the state of Washington views. Continuing work at a Hanford repository will lead to ever-higher repository cost estimates with an unacceptable number of worker injuries and fatalities.

Retrievability

Under 10 CFR 60 waste packages must be retrievable for up to 50 years after emplacement, either for recovery of increasingly valuable materials or because of a repository failure. As spent fuel is added to the rock system, up to its size and tonnage capacity, enormous amounts of "new" heat will affect the already hot, inherently unstable Hanford geologic environment. If mining conditions are going to be at the limits of tolerability for men and equipment at the beginning of operations underground, mining experience indicates that toward the end they will be so difficult, dangerous and expensive that recovery of tens of thousands of individual waste containers will be practically impossible. In real mines workings are kept open only for a matter of months, then abandoned to collapse and admit groundwater saturation. There is no job underground more feared, for good reasons, than dewatering and renovating an old, wet, deep mine. Even clean, dry mines require constant, costly maintenance and that is confined to shafts, main haulageways, and utility rooms. After up to nearly a century of oxidation and thermo-mechanical stress, none of the supports, sealants or systems in a Hanford repository could be trusted; the mine would have to be totally rebuilt out to the working faces.

USDOE has recognized the seriousness of the problems associated with retrievability from deep basalts. In the 1982 Site Characterization Report, the approach was to use long horizontal boreholes with multiple canisters in each borehole. At each new stage of the program USDOE has added an additional engineering "fix" to remedy the retrievability situation. The current approach envisions short horizontal boreholes, steel liners, and prepacked backfill "doughnuts". Each of the proposed solutions had significantly increased costs while not providing confidence that the containers could be recovered in the manner specified in the Act. USDOE should be required, as a pre-condition to continued site work, to show cause why it should not be disqualified on this point alone.

The Presence of Natural Gas

USDOE siting guidelines have a disqualifying condition for natural resources which states that a site shall be disqualified if:

> *"1) Previous exploration, mining, or extraction activities for resources of commercial importance at the site have created significant pathways between the projected underground facility and accessible environment . . ."*

USDOE response was as follows:

> *"Records do not reveal any major previous exploration, mining, or extraction of resources in the reference repository location. This data base is not expected to change . . ."*

> *"2) Ongoing or likely future activities to recover presently valuable natural mineral resources outside the controlled area would be expected to lead to an inadvertent loss of waste isolation."*

USDOE response was as follows:

> *"Possible future activities to recover presently valuable natural mineral resources (high unit value or oil and gas) outside the controlled area are not expected to lead to an inadvertent loss of waste isolation . . ."*

Attachment #4 is a package which contains the following:

1. Language from the May 1986 Environmental Assessment about the disqualifying condition for natural resources.
2. Letters from USDOE to the U.S. Bureau of Land Management which document many requests for leasing of USDOE land on the Hanford site for exploratory drilling for oil and gas. USDOE turned down these requests because Hanford was and is under consideration for a repository.
3. A Washington State Department of Natural Resources report which documents the great petroleum potential beneath the Hanford Reservation.

4. Copies of documents in the public domain which document previous exploration and extraction activities on the Hanford site.

5. A copy of Washington State Nuclear Waste Board Resolution 87-2, which petitions Secretary Herrington to reassess the disqualifying condition relating to natural resources on the Hanford site.

Hanford groundwaters are saturated with methane, as natural gas, at repository depth. It poses threats of asphyiation and explosion if not continuously removed from all workings. The recent determination by USDOE that gassy conditions will exist at the repository horizon has resulted in concerns about the adequacy of ventilation. Attachment #5 is a letter to USDOE requesting specific information concerning the reasons for increasing the size of the second exploratory shaft at Hanford.

USDOE has not explained how, during the 50 years after waste package emplacement, natural gas will be removed from the unventilated portions of the mine. Groundwater further heated by waste packages holds less gas than does unheated groundwater. Only the working areas of the mine will be ventilated so natural gas will concentrate in unventilated areas causing serious safety problems. As mentioned earlier, additional engineering fixes greatly increase costs while not correcting the basic problems.

Any one of the four distinct adverse conditions at Hanford are sufficient reason not to go ahead with site characterization at Hanford.

In addition to the four conditions mentioned above, we are concerned about USDOE's general approach to site characterization. USDOE tends to ignore independent data gathered by other professional organizations and it tends not to conduct early searches for "fatal flaws" with the potential for site disqualification. Examples follow.

- In 1978 the Washington Public Power Supply System, not USDOE, contracted for an aeromagnetic survey of about 15,000 square miles, to support the NRC licensing application for its Nuclear Project No.2 located on the Hanford Reservation. This extended far beyond the Reservation in all directions and was a high-quality, high-resolution, state-of-the-art survey. It is part of the public record. Using standard methods of mineral exploration, state scientists in 1985 interpreted the data and found that geologic faults mapped in surface outcrops were clearly confirmed by the aeromagnetic map. It was also found that these simple linear features were easily extended into areas of alluvial sedimentary cover, and that these extensions are suggestive of a fairly dense faulting pattern in the Mid-Columbia region. This is wholly consistent with other independent data such as microearthquake epicenters and satellite photlineaments. At the repository site they found a bounding fault pattern and supplied their maps to USDOE. USDOE has the 1978 aeromagnetic survey, because it is referenced ("Weston 1978") in some of their documents, but to our knowledge has not used it--at least no interpretation has been published. This is disconcerting for two reasons: faults have the potential to be groundwater pathways and are critical to repository performance; and the aeromagnetics rationalize the location of small earthquake epicenters, which DOE treats as random events of little significance to the repository. If these faults are present and active, then they are likely to be open pathways to the environment.

- Throughout the eleven years of site work on the Hanford Reservation, there has been an inexplicable reluctance to drill specifically for the purpose of finding faults and other "fatal flaws" with the potential for site disqualification. Many deep holes have been drilled in and around the repository site for lithologic and hydrologic testing, but virtually none for what in the mining and petroleum industries is called "condemnation". Condemnation is the earliest possible discovery of any adverse information which would lead to a management decision to abandon a site and move on. Deep drilling is expensive, but its cost is trivial compared to the $400 million already spent and the $1 billion projected for site characterization. We view condemnation drilling as a prudent National investment, with the target of saving large amounts of time and money, plus freeing limited DOE resources for work on other, more suitable sites. As a case in point: In 1984 the state of Washington suggested informally that DOE drill beneath the Hanford Reach, a straight segment of the Columbia River and the locus of a concentrated microearthquake swarm known as the Wooded Island swarm. The reasoning then was that the atypical N-S alignment of this 17-mile section is consistent with a regional pattern of parallel structures seen in outcrop and on satellite imagery, and that a fault here would be hydrologically very significant to repository performance. Then in 1985 the aeromagnetic interpretation indicated that in fact there was a potential fault under the Hanford Reach and that the Wooded Island swarm was precisely located at a triple junction with NW and NE structures intersecting the N-S structure. In our view active N-S faulting, such as is present to the SW on the mapped Service anticline, is an important part of the Hanford tectonic regime and should be a high priority target. DOE apparently disagrees, as they show complete disinterest in the proposal to drill there.

- Finally, we note another pattern in DOE's past work which is more difficult to pin down, but which has potential significance for the near future. That is best exemplified by the approach taken to subsurface geophysical methods, including seismic reflection, gravity and magnetotelluric surveys. Some work has been done, but in most cases the survey lines were extremely short and localized to the repository site. To industry-trained professionals such work is essentially wasted effort because the local data cannot be interpreted except against a regional pattern. The DOE approach does not lead to conclusions. Its approach does lead to more studies, more time, more money for "busy work".

Adequacy of the Five Sites

1. USDOE claims that all five of the sites nominated for the first repository are quite adequate to be considered for characterization and that projected performance at any of these sites will far exceed applicable EPA standards for release standards.

USDOE claims are overly optimistic and are a result of a USDOE management approach based on competition among projects which were "grandfathered" into the Act. Attachment #6 is a USDOE fact sheet titled "Management Changes in the Geologic Repository Program". The following is a direct quote.

> *"The Nuclear Waste Policy Act (NWPA) caused a fundamental change in the character of the Geologic Repository Program. Prior to the NWPA, the Geologic Repository Program had many of the characteristics of a competition among three distinct projects, where each was managed by a different project office located under a different DOE operations office. The program's strategy was that the repository would be built by the project office that first produced a satisfactory site."*

It is important to note that all five of the sites nominated for the first round were chosen under a strategy which forced unrealistic schedules in order to produce a satisfactory, rather than a superior site. Using this fast track management scheme, USDOE zeroed in on the federally-owned sites in Washington and Nevada because purchasing land would take too much time.

In the case of the non-salt states of Washington and Nevada, the site selection process led to less than adequate sites. For example, drafts of the Multiattribute Utility Report clearly showed that post-closure performance at the non-salt sites could be significantly worse than the base case reported in the document. A draft of the report stated:

> *"The results of sensitivity analyses strongly suggest that sites with lower expected post-closure utilities also tend to have greater uncertainties in postclosure performance. This range of uncertainty indicates little opportunity for the sites to improve, based on the results of site characterization studies, beyond the best-estimate values. However, there is considerable opportunity, especially for the non-salt sites, to retrogress, based on the results of site characterization studies, below the best-estimate values".*

Again, the USDOE scientists and their contractors recognized the uncertainties associated with the non-salt sites and now, only ten months after the May 28th decisions, we are already seeing results which show Hanford has retrogressed below the best-estimate values. As mentioned earlier, there is clear and convincing evidence that the 10 CFR 60 groundwater travel times to accessible environment cannot be met at Hanford.

It must be remembered that the working USDOE scientists recognized the uncertainties which indicated that Hanford postclosure performance could be significantly worse than the base case. The decision to delete the relevant material from the drafts and to ignore ranking were made by headquarters USDOE managers who remain on the job today.

2. If USDOE's contention is true, what do you think its implications are for site selection?

Clearly, many USDOE scientists and their consultants do not agree with USDOE management on this issue. If USDOE management's contention has some truth, USDOE should not have to spend a billion dollars for characterizing Hanford, the most expensive, least safe site. The implication would be that a repository could be sited just about anywhere USDOE found it programmatically convenient. Nationwide, there would surely be many more "adequate" sites which would meet NRC and EPA standards and be cheaper to characterize than Hanford. In addition, characterization of such sites would result in fewer injuries and fatalities than characterization at Hanford.

"Fixing the Problem"

1. Suppose you could make a list of the things you'd want DOE to do differently within the framework of the Act in considering the site in your state. Assume that if DOE agrees to make the changes on the list, then you will cooperate in allowing site characterization to proceed. Could such a list be drawn"?

It is not possible to make such a list because USDOE clearly acted outside the framework of the NWPA by choosing the Hanford site and indefinitely postponing the second round. USDOE must implement the Act as Congress intended. Objective, scientific factors, not fast track competition, must dictate the site selection process. Because of these faults and the resultant lack of credibility, USDOE or its successor agency or commission, must begin again to select sites for characterization. Governor Gardner has proposed a process for getting the program back on track. The Nuclear Waste Board passed Resolution 86-3 (Attachment #7) which describes and supports the Governor's proposal.

More important than a list of changes is a change in philosophy and management approach toward repository siting. Past searches for repository sites have placed too little emphasis on the hydrologic setting. We suggest the general approach outlined in the U.S. Geologic Survey Circular 903, "Disposal of High-Level Nuclear Waste Above the Water Table in Arid Regions". This study dealt with geohydrologic factors and the final selection of sites for characterization would depend on other site selection guidelines.

USDOE or its successor agency must commit to characterize only geohydrologically superior sites. In order for the public to accept a repository, the site must be more than "quite adequate" and the site should not be expected to "retrogress" during site characterization. This means that uncertainties must become a more important factor in site selection. USDOE or its successor agency must be constantly looking for fatal flaws. Attachment #8 is a paper by William A. Brewer which proposes the principle of "condemnation" which is fundamental in commercial exploration methods.

Not In My Backyard

1. Every state being considered for the repository knows several reasons why the site should not have been chosen for characterization. What would be your response to allegations that your objections are being raised only to avoid the location of a repository in your state?

The state of Washington backyard already contains the free world's largest accumulation of radioactive waste produced as a result of defense programs. A large portion of this accumulation is made up of liquid high-level wastes temporarily stored in tanks. Many of these tanks have already leaked. The safe permanent disposal of these wastes is the highest priority for the next 400 generations of Washington State citizens.

The Nuclear Waste Policy Act, if implemented in a credible, scientific manner, provides a blueprint to safe, permanent disposal. Governor Gardner and the Washington State Nuclear Waste Board have stated that any acceptance of a repository at Hanford must satisfy three conditions: (1) it must be demonstrated to our satisfaction that it is safe; (2) it must be superior to any other site under consideration; and (3) it must be acceptable to the citizens of Washington.

Washington State citizens may never become technical experts in the area of repository safety, but they can easily determine if the process is conducted in an open, credible, technically valid manner. Washington State citizens were shocked when on May 28th of last year, USDOE ignored the rankings done by its own experts and consultants to select the most costly and least safe site for characterization. In addition, the unilateral and arbitrary decision to "indefinitely postpone" the site selection process for a second repository was clearly in direct violation of the Nuclear Waste Policy Act. Citizen response was swift and direct. In the November elections, 83% of the voters recognized a flawed process and directed state officials to continue to take all possible steps to halt the USDOE's unlawful implementation of the site selection process. Clearly, our backyard is already contaminated. Our objections are raised against a flawed, politically motivated process. We will continue to work toward open, credible, technically valid solutions.

Gardner Proposal

1. What is your opinion of Governor Gardner's proposal for a non-binding conflict resolution process to develop a consensus on how to proceed with the program? Would this solve the problems with the program as you see them?

Governor Gardner's proposal is a good faith attempt to get the program back on track. Positive results can be achieved if USDOE acknowledges the seriousness of the problems and supports and participates in consensus-building. If USDOE is not willing to cooperate, Congress and other interested parties must take the initiative to develop a consensus on the best approach so we can move ahead toward safe, permanent disposal.

Need to Amend the Act

1. Are you asking Congress to amend the Nuclear Waste Policy Act to address the issues you raised in your testimony?

-- If so, could you describe your proposed amendments to the Act?

-- If not, how do you propose that the Department move forward with the program?

As a result of USDOE's flawed implementation of the NWPA site selection process, the repository program is approaching a standstill. In our opinion, the process established in the NWPA could have been successful if properly implemented. However, given the existing situation it appears that it will be necessary to revisit the Act. In order to do so in an orderly fashion, we must attempt to reach a consensus among the interested and affected parties as to resolutions of major issues. The major issues which must be resolved are the following:

1. What is the most effective solution to the utility's short-term spent fuel storage problem?
2. Is there a need for two repositories, and if so what is the appropriate timing as to the second repository?
3. What are the necessary elements of a repository site selection process which will provide confidence that the search will be for the best site and that selection decisions will be based on credible scientific evidence?

All of these issues are inextricably interrelated. These issues must all be resolved together as part of a package in order to develop a credible solution to the nation's high-level nuclear disposal problem. There are no "quick fixes" which can restore credibility to the current site selection process.

In order to develop a workable solution, a serious effort must be made to reach a consensus among the various interested and affected parties. We have proposed a course of action to USDOE. If USDOE is unwilling or unable to follow that proposed course of action, we hopeful that Congress will see the merit and the need to establish a forum and a process designed to reach a consensus solution to this national problem.

Economic Benefits

1. What economic (or other) benefits are there for your state or tribe if your site is chosen for the repository?

2. What discussions have you had with DOE about economic benefits?

3. Would more serious discussion of potential economic benefits, for both the period of site characterization and construction, increase your state's willingness to go along?

As stated earlier geohydrologic, safety, health, and the environment are the preeminent state of Washington concerns. A contract for socioeconomic impact studies is in the development stage. The studies, which are required under the Act, will be the vehicle used to determine positive and negative impacts of a repository.

The state of Washington has not had discussions with USDOE concerning economic benefits or incentives. Such subjects should be on the table during consensus-building sessions.

More serious discussions of economic benefits must also include serious discussions of the risks and negative economic impacts of a repository. Affected states and tribes need credible information on the total equation before they can determine "willingness". Now we only have vague, undefined information concerning the benefits side of the equation. For example, it is well known that characterization of the Hanford site will exceed a billion dollars. We do not know what percentage of the budget will be spent within the state of Washington. It is our understanding that only a small percentage of the budget will actually be spent in our state.

We have not yet started to collect information concerning the negative impacts side of the equation. USDOE has recently indicated that much of the impact information gathering should be delayed two years to coincide with EIS scoping. This means credible information on the total equation will be further delayed.

It may be that economic incentives would be useful in the final selection among sites on a list of safe, qualified sites. The current selection process has not been conducted in a credible manner. Discussion of economic incentives prior to a proper selection process may result in a repository which does not function as intended; what is needed first is a valid ranking process, implemented to select the safest sites to solve this national problem.

STATE OF WASHINGTON
OFFICE OF THE GOVERNOR

OLYMPIA
98504-0413

BOOTH GARDNER
GOVERNOR

January 27, 1987

Ben C. Rusche, Director
Office of Civilian Radioactive
Waste Management
U.S. Department of Energy
1000 Independence Avenue
Washington, D.C. 20585

Dear Mr. Rusche:

Enclosed is the state of Washington report to Congress concerning consultation and cooperation negotiations with the U.S. Department of Energy. I understand you will soon be transmitting this report to Congress along with your report.

Please contact Curt Eschels or Terry Husseman if you have any questions about this report.

Sincerely,

Booth Gardner
Governor

Enclosure

Legislative Building AS-13 • Olympia, Washington 98504 • (206) 753-6780 • (Scan) 234-6780

STATE OF WASHINGTON

Report to Congress
Concerning Consultation and Cooperation Negotiations with the U.S. Department of Energy

January 1987

The state of Washington report to Congress Concerning Consultation and Cooperation Negotiations with the U.S. Department of Energy (USDOE) will review past actions, assess the current situation, and summarize the reasons why agreements have not been concluded.

PAST ACTIONS: From July 1983 until December 1984, the state of Washington and USDOE made a good faith effort to negotiate. In spite of many long negotiating sessions, the parties were unable to resolve many serious issues such as federal liability, defense waste, water rights, foreign waste, transportation, work suspension, emergency response planning and other issues. The state became convinced that the C&C process was not effective when two Section 117(b) Governor's letters obtained positive results in the areas of defense waste and water rights, even though the subjects had been subjects of intense negotiations for eighteen months.

From December 1984 until May 1986, the state of Washington and USDOE were heavily involved int he Environmental Assessment process. Governor Gardner asked that USDOE do a credible comparative analysis with input from states, tribes and independent experts. The May 28 decision to include Hanford as one of the three sites selected for characterization even though it ranked lowest of all sites under consideration, and the illegal decision to indefinitely postpone the search for a second repository led litigation and the overwhelming ratification of Referendum 40 which directs state officials to continue challenges to the federal site selection process.

CURRENT SITUATION: The site selection process to date was a flawed, politically-based program that has destroyed USDOE credibility. Past actions and continuing litigation have created a situation where C&C negotiations at this time, are not a reasonable option.

WHY AGREEMENTS HAVE NOT BEEN CONCLUDED: Agreements have not been concluded because past negotiations were not effective and because the May 28th decisions have destroyed USDOE's credibility. C&C negotiations cannot be successful until credibility is restored. USDOE must take the lead in bring the program back on track. Governor Gardner's conflict resolution process is a reasonable, attainable proposal which could lead to a mid-course correction consistent with the Nuclear Waste Policy Act.

STATE OF WASHINGTON

Consultation and Cooperation (C&C) Chronology

July 1983: Negotiations began because construction of the exploratory shaft appeared imminent. From July 1983 to July 1984 there were twelve negotiating sessions with USDOE and twenty-one state negotiating team meetings.

December 1983: An early draft document was prepared and forwarded to the Nuclear Waste Board and the Legislature for review and comment. The Legislature passed Concurrent Resolution 142 which directed the negotiating team to place more emphasis on issues relating to foreign waste, work suspension, injunctive relief, federal liability, commingling defense wastes, emergency response planning. The Legislature passed a bill which provides specific procedures for negotiating, reviewing, approving and modifying agreements.

July 1984: Another preliminary draft document was forwarded to the Nuclear Waste Board. The Board considered using the document for public hearings, but many unresolved issues and the December 1984 release of draft Environmental Assessments put an indefinite hold on further review.

March 1985: Governor Gardner wrote Section 117 30-day letters to Secretary Herrington concerning defense waste and state water right laws and permit requirements for site characterization activities. Although the C&C teams had been unable to resolve these issues after nearly two years of negotiations, the Secretary's responses to Governor Gardner documented significant changes to earlier USDOE negotiating positions.

May 1986: USDOE announced its decision to include Hanford as one of three sites selected for characterization even though USDOE scientists and their consultants had ranked Hanford lowest of all sites considered for pre-closure factors, for post-closure factors, and composite overall ranking.

July 1986: Detloff von Winterfeldt, a nationally respected decision analyst who had been a consultant to the National Academy of Sciences (NAS) Board on Radioactive Waste Management, expressed serious concerns about the value judgments used by USDOE to make its decisions.

August 1986: Lee Olson, Richland Operations Office, wrote to Terry Husseman, Program Director, asked for a joint C&C meeting with other states and the tribes. Mr. Husseman's response questioned the need for joint meetings and suggested USDOE decision making be the first issue to be discussed.

October 1986: Congressional subcommittees reported conclusive evidence which lead to the conclusion that USDOE distorted and disregarded its own scientific analysis in order to support selection of Hanford.

November 1986: Ralph L. Keeney, a nationally respected decision analyst who had been a USDOE consultant during EA negotiations, issued a report which confirmed that Hanford is the least desirable site because of its enormously greater costs and its greater health effects are not compensated for its relatively slight advantage in environmental and socioeconomic impacts.

November 1986: Washington State citizens, in unprecedented numbers, support Referendum 40, which directs state officials to continue challenges to the site selection process.

December 1986: Eco Northwest, a consultant to the Nuclear Waste Board, concluded that the Recommendation Report fails to document its assumptions or its conclusions, and is a travesty of nearly everything that decision-aiding methods stands for.

December 1986: USDOE, in a letter to Governor Gardner, renewed the offer to negotiate. Governor Gardner and Ben Rusche met on December 18 to discuss C&C negotiations. In a December 30 response to the Office, Governor Gardner indicated that past actions and continuing litigation have created a situation where C&C negotiations, at this time, are not a reasonable option. He pointed out that negotiations cannot be successful until program credibility is restored, and that USDOE must take the lead in bringing the program back on track. He enclosed his proposal for a conflict resolution process which could restore credibility to the program. He asked Secretary Herrington to review and seriously consider the proposal.

STATE OF WASHINGTON
NUCLEAR WASTE BOARD
Mail Stop PV-11 • Olympia, Washington 98504 • (206) 459-6670

February 6, 1987

Benard Rusche
U.S. Department of Energy
1000 Independence Avenue
Washington, D.C. 20585

Dear Mr. Rusche:

On January 28, 1987, you submitted a draft amendment to the Mission Plan to Governor Gardner and the state of Washington for review prior to formal transmittal to Congress. In your submittal letter you indicated we would be allowed a 60-day comment period. Because we have not had timely and complete information regarding determinations or plans with respect to design of the BWIP exploratory shaft, I now respectfully request such information so the state of Washington can make timely comments on the draft amendment to the Mission Plan.

I request specific information on the design basis for your decision to change the size of the second BWIP exploratory shaft from an inside finished diameter of 6 feet to an inside diameter of 10 to 12 feet. We need the specific reports and memos you and your managers used to make the decision that a larger shaft is needed. Specifically, we need to know if inputs to the design, such as the concentrations of dissolved gases, have changed. We also request the statements of work for all studies relating to the change in shaft size.

When we receive the information, we will review it to ensure your decision is consistent with provisions of the Nuclear Waste Policy Act (NWPA) which limits site characterization activities to those necessary to provide the data required for evaluation of the suitability of the site for an application for a construction authorization. The most cost effective use of the shafts in the operating repository is not consistent with that NWPA provision.

I look forward to a timely receipt of the information so the state of Washington can conduct an adequate review of the draft amendment to the Mission Plan.

Sincerely,

Warren A. Bishop

Warren A. Bishop, Chair

WAB/DP:hlt

cc: Mike Lawrence
John Anttonen

ANDREA BEATTY RINIKER
Director

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY
Mail Stop PV-11 • Olympia, Washington 98504-8711 • (206) 459-6000

December 10, 1986

John H. Anttonen, Assistant Manager,
Commercial Nuclear Waste
Richland Operations Office
P.O. Box 550
Richland, WA 99352

Dear Mr. Anttonen:

Copies of the U.S. Department of Energy's (USDOE) working draft Environmental Monitoring and Mitigation Plan (EMMP) and Socioeconomic Monitoring and Mitigation (SMMP) for the Hanford Site Basalt Waste Isolation Project arrived on December 2, 1986. The material was delayed because it was sent to the wrong address.

The EMMP and SMMP are intended to describe the steps USDOE will take to mitigate the impacts of site characterization. We certainly can not provide meaningful comment on the impacts of site characterization until we have an opportunity to review the Site Characterization Plan (SCP). As you know, we have not been allowed to see any of the early drafts of the SCP which you are now working on.

The Nuclear Waste Policy Act consultation provisions require the Secretary of Energy to provide timely and complete information regarding determinations or plans made with respect to site characterization. The cooperation aspect of the Act envisions that USDOE would at least consider our comments before charging ahead with documents such as the EMMP and SMMP. The following are examples of our frustration.

- On May 8, 1986, the Environmental Coordinating Group met in the Forrestal Building to review the EMMP annotated outline. The first state of Washington comment had to do with the absence of quality assurance in the outline. We were assured this oversight would be corrected. The oversight has not been corrected in the working draft.

- Another item of discussion was the need to know the amounts and locations of existing wastes already in the Hanford environment. The rationale is that site characterization activities at Hanford will further spread the chemical and radionuclide contamination. This is a major environmental impact during site characterization at Hanford and the amounts and location of the contaminants must be included in the EMMP. The information is not included in the working draft even though the request was confirmed in writing.

- On May 8, 1986, a USDOE/NRC/States/Tribes meeting was held on level of detail in the SCP. One of the results of the meeting was a commitment by USDOE to provide a 15 to 20 page document which describes on-going investigations and tests, describes the rationale for such work, shows how the tests tie into other documents, and a list of planned tests. We have not received this document.

- During the August 12 and 13, 1986 quarterly USDOE/States/Tribes meeting, USDOE again promised to provide the foregoing information to the state of Washington. During the September 10 ECG meeting in Washington, D.C., it was reported that a draft of the document was at USDOE headquarters being reviewed for style and content. The state of Washington representative strongly expressed the need to have the document available before the working draft EMMP was issued.

- On October 31, 1986, Governor Gardner formally requested, pursuant to Section 177(a) of the NWPA, "timely and complete information regarding determination or plans made with respect to the site characterization . . . of such repository." On November 23, we received Ben Rusche's response which stated "a final reply will be sent to you within 3 weeks." We still have not received a reply.

  You will note that we will not receive a reply to the Governor's letter until well into the review period of the working draft EMMP. We need to know detailed information about site characterization activities before we can begin review of the working draft EMMP. Your commitment to provide draft material on EMMP as early as possible is of little value unless and until your other commitments concerning quality assurance, site contamination, and site characterization information are met.

It is clear that we are unable to review the working draft EMMP until the earlier USDOE commitments are met. We agree that EMMP and SMMP are only one part of the USDOE field program at Hanford and the consultation and cooperation components of the NWPA require you to also provide timely information on all aspects of the program.

I would be happy to meet with you or your designee after we receive the earlier promised information so we can discuss a reasonable review period.

Sincerely,

Husseman

Terry Husseman, Director
Office of Nuclear Waste Management

TH/DP:kc

WARREN A. BISHOP
Chair

STATE OF WASHINGTON
NUCLEAR WASTE BOARD
Mail Stop PV-11 • Olympia, Washington 98504 • (206) 459-6670

March 30, 1987

Benard C. Rusche, Director
Office of Civilian Radioactive
  Waste Management
U.S. Department of Energy
Mail Stop RW-43
Washington, D.C. 20585

Dear Mr. Rusche:

In early December we received working copies of the U.S. Department of Energy's (USDOE) working draft Environmental Monitoring and Mitigation Plan (EMMP) and Socioeconomic Monitoring and Mitigation Plan (SMMP) for the Basalt Waste Isolation Project (BWIP). On December 10, Terry Husseman called Mr. Anttonen and wrote a letter to him which indicated we were unable to review the EMMP until earlier USDOE commitments are met. We have not as yet received information concerning quality assurance and the amounts and locations of existing contamination in the Hanford environments. BWIP personnel and their contractor did attempt to include the requested information in an early Project Office draft, but we understand that the requested information was deleted during a headquarters review. As a result, we are unable to adequately review the documents.

The following documents are submitted as Washington State Nuclear Waste Board preliminary but incomplete comments on the working draft EMMP and SMMP.

1. December 10, 1986 letter to John Anttonen from Terry Husseman.
2. The February 27 comments of the Washington State Legislature members of the Environmental Monitoring Committee. (Endorsed by the Nuclear Waste Board during its March 20 meeting.)
3. The February 27 comments of the Socioeconomic Committee.

We are sending our comments directly to you because we understand that Office of Civilian Radioactive Waste Management decisions resulted in the deletion of our requested information from early Project Office drafts. We again request this information.

Sincerely,

Warren A. Bishop

Warren A. Bishop, Chair
Nuclear Waste Board

WAB/DP:hlt

Attachment

cc: John Anttonen, BWIP
  Steve Whitfield, BWIP

STATE OF WASHINGTON
NUCLEAR WASTE BOARD
Mail Stop PV-11 • Olympia, Washington 98504 • (206) 459-6670

February 6, 1987

Benard Rusche
U.S. Department of Energy
1000 Independence Avenue
Washington, D.C. 20585

Dear Mr. Rusche:

On January 28, 1987, you submitted a draft amendment to the Mission Plan to Governor Gardner and the state of Washington for review prior to formal transmittal to Congress. In your submittal letter you indicated we would be allowed a 60-day comment period. Because we have not had timely and complete information regarding determinations or plans with respect to design of the BWIP exploratory shaft, I now respectfully request such information so the state of Washington can make timely comments on the draft amendment to the Mission Plan.

I request specific information on the design basis for your decision to change the size of the second BWIP exploratory shaft from an inside finished diameter of 6 feet to an inside diameter of 10 to 12 feet. We need the specific reports and memos you and your managers used to make the decision that a larger shaft is needed. Specifically, we need to know if inputs to the design, such as the concentrations of dissolved gases, have changed. We also request the statements of work for all studies relating to the change in shaft size.

When we receive the information, we will review it to ensure your decision is consistent with provisions of the Nuclear Waste Policy Act (NWPA) which limits site characterization activities to those necessary to provide the data required for evaluation of the suitability of the site for an application for a construction authorization. The most cost effective use of the shafts in the operating repository is not consistent with that NWPA provision.

I look forward to a timely receipt of the information so the state of Washington can conduct an adequate review of the draft amendment to the Mission Plan.

Sincerely,

Warren A. Bishop, Chair

WAB/DP:hlt

cc: Mike Lawrence
John Anttonen

WASHINGTON STATE NUCLEAR WASTE BOARD

RESOLUTION 86-3

June 20, 1986

WHEREAS, on May 28, 1986, the U.S. Department of Energy (USDOE) announced that it had selected Hanford for site characterization;

WHEREAS, on May 28, 1986, USDOE also announced that it had postponed indefinitely site specific work for a second repository;

WHEREAS, the USDOE unilateral decision to indefinitely postpone the second-round site selection process was a political decision which showed disregard for the Nuclear Waste Policy Act;

WHEREAS, in selecting Hanford for characterization, USDOE ignored the results of the National Academy of Sciences ranking methodology which indicated the Hanford site is the most costly and least safe site of the five sites under consideration; and

WHEREAS, on June 16, Governor Gardner, in testimony before Congress, stated that it will be impossible to locate a repository anywhere if decisions are based on politics rather than science.

NOW, THEREFORE, BE IT RESOLVED that the Washington State Nuclear Waste Board supports the efforts of Governor Gardner, Congressman Morrison and Congressman Swift, and others to:

1. Bring the repository site selection process to an immediate halt;

2. Restructure the site selection process to ensure independent technical groups are included in the decision making process;

3. Combine the first and second round states and conduct a nationwide search for the safest repository;

4. Eliminate unrealistic deadlines;

5. Require an independent study of the need for a second repository as opposed to expanding a single repository; and

6. Authorize construction of an MRS facility and require its completion at an early date.

The Nuclear Waste Board directs the Chair to transmit this Resolution to the President of the United States, the Secretary of Energy, and the state of Washington Congressional delegation.

Approved at Olympia this 20th day of June, 1986.

Warren A. Bishop

WARREN A. BISHOP, CHAIR
WASHINGTON STATE
NUCLEAR WASTE BOARD

TESTIMONY OF

GOVERNOR BOOTH GARDNER

STATE OF WASHINGTON

TO

SENATE SUBCOMMITTEE ON ENERGY RESEARCH AND DEVELOPMENT

JUNE 16, 1986

In January of 1985, when I became Governor, one of the first challenges presented to me was the State's reaction to the possibility that Washington could become a home for the Nation's high level nuclear waste.

We in Washington State approached the likelihood differently than my counterparts in other states.

We didn't say, "Hell no, not in my backyard." Instead we took the responsible tack that there must be an answer for the high level nuclear waste problem.

The keys to our participation in the process were two criteria:

1. The decision would be made based on science. The safest, and only the safest, site would be selected, and politics would not be part of the process.
2. DOE was to follow the rules established in the Nuclear Waste Policy Act.

It is disappointing that I must report to you that we believe both those conditions for our support have been violated by DOE.

The elimination of the second round site selection process violates the Nuclear Waste Policy Act, succumbs to politics, and tells us that instead of searching for the safest national location, DOE is limiting the search to the Western United States.

Now, let's talk politics. Everyone knew what a delicate process it would be to locate a repository and the fear, in Congress, was that it would be impossible if the decision was to be made based on political clout.

That's why it was agreed that science must be the driving factor. As a part of the delicate compromise that allowed the passage of this act in the first place, it was determined that there must be two rounds for siting the repository. Now DOE has flagrantly violated the compromise made by Congress.

What is the result of DOE's failure to live by the rules?

To put it in simple terms: If the federal government won't play by the rules, we will see you in court. The future of a repository will be tangled in the nation's court system for years to come.

I believe that our case is good enough that we will seriously delay the process, and probably prevail. The result is, 10 or 15 years down the line, the government will have invested a fortune and will find itself right back at step one.

Lawsuits are a negative solution. I also have a positive solution:

1. Bring the repository site selection process to an immediate temporary halt. Stop-work orders are already in effect in Washington and Nevada due to quality assurance problems, and no work has been started in Texas. Therefore, the immediate effects of such action would be minimal.

2. Restructure the site selection process.

    a. Establish a significant role in the decision-making process for independent technical groups such as USGS and NAS. We must get the scientists directly involved and remove politics from the decision-making process.

    b. Combine the first and second rounds and conduct a nationwide search for the safest repository.

    c. Eliminate specific statutory deadlines which almost everyone acknowledges cannot be met.

3. Restart the site selection process.

4. Require an independent study of the need for a second repository, as opposed to expanding the capacity of the single repository.

5. Authorize construction of an MRS facility and require its completion at an early date.

What is unique about this plan? We aren't saying, "Take Washington out of consideration." If DOE can show us that we should be in the characterization process, based on appropriate ranking methodology and based on an open and fair assessment of all potential sites, and ultimately if we are the safest site, then maybe we should be a repository site.

But, I can assure you of one thing: If DOE fails to follow a process that selects only the safest site and then it tries to locate the repository at Hanford, it can expect one hell of a fight -- a fight the people of Washington do not intend to lose.

RESPONSES TO QUESTIONS POSED BY SENATOR BENNETT JOHNSTON

STATE-DOE COOPERATION

1. Do you believe that your State has made a good faith effort to cooperate with the Department of Energy? Describe the contacts with DOE that you initiated. What were the results?

Response: In discussing the issue of interaction between the Department of Energy (DOE) and affected states/tribes, it is extremely important to consider the divergent perspectives from which interaction (in terms of consultation and cooperation) is approached. A fundamental problem (perhaps the fundamental difficulty) in state/tribe - DOE relationships lies in how the parties view the provisions in the Nuclear Waste Policy Act (NWPA) which require DOE to consult and cooperate with affected states and tribes.

From the onset, DOE has interpreted consultation and cooperation in a very limited way. DOE provides information, holds meetings, solicits State comments on draft materials at the same time it solicits public comments and generally goes through the motions required in traditional bureaucratic interactions. However, no attempt is made to provide states/tribes with early, substantive, and meaningful opportunities to shape decisions and influence program policy and implementation. There is a great deal of form but very little substance in DOE's interpretation of its duty to consult and cooperate.

States and tribes, on the other hand, view "consultation and cooperation" as a requirement for a more collaborative approach to program decision-making in areas where states/tribes have important interests. Nevada and other states have looked to DOE to provide more than token opportunities to comment on draft documents or review draft policies, when, in fact, decisions have already been substantially made. DOE is already so committed to a course of action that State comments/recommendations are superfluous. States have attempted to encourage the acceptance of a definition of consultation and cooperation which acknowledges the unique oversight role provided for potential repository states by the NWPA. Such a definition requires that states be involved early and in a meaningful manner in key decisions and activities so as to enable those states to actually have the opportunity to influence program policy and direction.

It should be noted that DOE intransigence in cooperating meaningfully with Nevada appears to emanate primarily from DOE/OCRWM headquarters. The Department's Nevada Project Office has been much more willing to cooperate with the state in a more substantive manner.

Officials of the State of Nevada have made a good faith effort to cooperate with the Department of Energy. On a number of occasions, meetings between Nevada officials and DOE Nevada Operations personnel have produced agreement on how we will interact. One such series of meetings produced a "Protocol" which specified how Nevada's technical contractors would gain access to the Yucca Mountain site to do independent testing. The "Protocol" was even signed by the Nevada DOE project management. Later DOE headquarters disavowed the agreement and denied funding for Nevada's independent testing.

Generally speaking, contacts with DOE, which are initiated by Nevada, seek information or propose technical study by U.S.

DOE or State contract personnel. Also generally, DOE's response is invariably very slow, overly analytic, bureaucratic, negative and frustrating to State efforts to participate.

An example of contacts initiated by the State is Nevada's repeated request in 1985-1986 to be made aware of the method by which DOE would decide which five of nine sites would be nominated and which three of five states would be chosen for characterization. This request was made orally and in writing to various individuals including William Purcell, OCRWM Director of the Office of Geologic Repositories, and OCRWM Director Ben Rusche. DOE refused to disclose the method until after site selection decisions were announced.

Another example of state-initiated contacts involved the Nevada Commission on Nuclear Projects' invitation to Mr. Ben Rusche to address the Commission on May 16, 1986. Mr. Rusche arrived in Las Vegas at 11:00 a.m., addressed the Commission and departed the meeting by 12:00 noon. He took no time to listen to citizen concerns which were scheduled to be heard later that afternoon. Chairman Sawyer asked Mr. Rusche specifically at that meeting what the decision methodology would be for site recommendation and whether Nevadans were accurate in assessing that Yucca Mountain had already been chosen. Mr. Rusche refused to divulge the decision methodology and stated that no decision had as of then been made selecting Yucca Mountain. In retrospect, it now appears that statement was false. The final action announcing the formal decision was made May 28, 1986, only twelve days later. Mr. Rusche's subterfuge prohibited any state participation in that decision. Finally, please recall that the requirement of the NWPA is that DOE cooperate with the state, not vice versa. See Section 117(b). In fact the requirement is that DOE "consult and cooperate" with the state. The clear connotation of this language is that DOE must ask the state's opinion on various programmatic matters, and give that opinion serious consideration. To date, this has not happened.

Nevada has commented in nearly every instance in which DOE has provided the opportunity. In the case of Nevada's comments on DOE's Draft Environmental Assessment, DOE essentially ignored over 800 pages of Nevada's suggestions. In a prior major interaction experience, the development of siting guidelines, DOE refused to consider the objective approach Nevada recommended, and which we believe the Act requires.

2. Do you believe that the DOE has made a good faith effort to cooperate with your State? Describe the contacts with you that were initiated by DOE. In these cases, what were the results?

Response: DOE's effort to cooperate with Nevada cannot be regarded as having been made in "good faith". Rather it has been perfunctory. DOE's ordinary method is to develop a position or procedure in advance, then inform the State of its decision. DOE has held many meetings where it provides states with information about policies and decisions, and then records these dates in a cumulative list purporting to indicate DOE's level of cooperation. DOE has never brought real agency decision makers to Carson City and to sit down with Nevada personnel and discuss, in advance, the philosophy and approach of any particular decision.

An example of DOE's attempts to cooperate with states on issues of considerable importance to those states involves DOE's invitation for states and tribes to participate in various issue-specific "coordination groups." Nevada (and other states) learned in 1985 that DOE was holding regular coordination group meetings for socioeconomic issues, transportation issues, environmental issues and quality assurance issues. These meetings were initiated by DOE as planning and decision-making sessions to be attended by DOE staff (Headquarters and Project Office) and contractors working on specific aspects of the high-level nuclear waste program. After considerable prodding, DOE invited affected states and tribes to attend these meetings, ostensibly to provide a forum where states/tribes and the Department could work cooperatively in a "hands-on" manner, to address common interests in the areas of socioeconomics, transportation, environmental assessment and quality assurance.

The concept appeared to be a promising one. However, from the time states/tribes began attending meetings, the format and content of those meetings was changed. Instead of being forums where states/tribes and DOE worked cooperatively to arrive at mutually acceptable approaches and decisions, the meetings have become sessions where DOE makes presentations and where state's concerns are taken down as "action items" for DOE review at future times. No DOE decision makers are present so no real work gets accomplished. Rather than meaningful joint working sessions, the coordination group meetings have become, essentially, DOE show-and-tell forums.

Nevada has repeatedly sought participation in DOE socioeconomic and environmental monitoring and mitigation plans. State and local representatives met on several occasions with DOE/Nevada staff and contractors and provided DOE with issues and factors to be considered in the plans. When these contacts first began, DOE/Nevada promised that State and local concerns would be given full consideration and that the monitoring and mitigation plans would be developed cooperatively with state and local representatives. DOE Headquarters' directives during the summer and fall of 1986, however, prohibited the DOE/Nevada office from fulfilling that commitment and even prohibited DOE staff and contractors in Nevada from meeting with State or local officials until after November of 1986. As a result of this DOE policy of total non-cooperation, not one of the State/local issues was addressed in the draft monitoring and mitigation plans released in late November 1986.

Nevada believes that the Nuclear Waste Policy Act clearly requires DOE to consult and cooperate with the State, and that the burden of effectuating such consultation and cooperation rests with the Department. In this regard, DOE must ask the State's opinion on various programmatic matters and then give such opinion serious consideration. This has not happened in the program to date.

SITE-SPECIFIC TECHNICAL ISSUES

1. What do you consider the most important technical, scientific or engineering reasons why your site is inappropriate for a repository? Do you believe that DOE is ignoring scientific information about these matters? What information?

Response: Concerns about the technical adequacy of the proposed Yucca Mountain repository site in southern Nevada have been around for a number of years. Questions from the scientific community have centered on the high potential for technical flaws at the site given the active nature of the geologic environment in Nevada.

The National Academy of Sciences (NAS) first expressed concerns about technical factors in 1979 in correspondence to the Department of Energy (letter from E.F. Gloyna to S. Meyers, dated April 23, 1979). In early 1979, DOE came to the NAS - Committee on Radioactive Waste Management and requested the Committee's preliminary views on the potential of tuff, particularly in southern Nevada, as a repository host rock. In the April 23rd letter, the NAS, while admitting the long and deep groundwater flow paths, low-water velocities, low population, and extensive federal land ownership were attractive attributes, identified potential difficulties associated with tuff as a medium for radioactive waste isolation. These potential difficulties, considered fundamental by the NAS, focused on the seismic and volcanic stability of candidate areas of tuff, the significant lateral variations in thickness and character of tuff, the fact that tuff terrains are typically broken by faults into blocks of varying size, the stability of tuff in the presence of hot electrolyte solutions, and the possible presence of natural resources. In concluding the letter, the NAS suggested that "explorations and investigations be conducted in a logical sequence so as to assure that certain fundamental questions are addressed first before major resources are committed." (Emphasis supplied).

In 1983 after the Nuclear Waste Policy Act was passed and the Nuclear Waste Project Office was established by the Governor to provide Nevada oversight of the program, the State set out to define and understand what might be the technical issues concerning a repository sited in tuff in southern Nevada. This office reviewed the NRC regulations on siting high-level radioactive waste facilities (10 CFR Part 60) and the EPA standards for management of high-level radioactive waste (40 CFR Part 191) and consulted with State and university scientists knowledgeable of geologic, hydrologic, and engineering characteristics of tuff and the southern Nevada area. Based upon that review and analysis, the State established two lists of issues critical to health, safety and the environment. One list addressed site suitability issues and the other addressed site performance issues. Site suitability issues include:

1. Characterization of moisture movement through the unsaturated zone.
2. The relationship of Yucca Mountain groundwater regime to the regional acquifer system.
3. The effect of future climatic variations and resulting changes in the hydrogeologic regime on the integrity of the site.
4. The effects of future faulting or other tectonic events on the integrity of the site.
5. The effects of future volcanism on the integrity of the site.
6. Human interference of the site due to perceived presence of extractable natural resources.

Site performance issues include:

1. Groundwater travel time to the accessible environment.
2. The effect of host rock geochemistry on the retardation of radionuclide transport.
3. The effect of fuel cladding, waste canister materials, and

backfill in preventing or restricting radionuclide transport.

4. The uncertainty in projecting performance assessments to the 1,000 and 10,000 year time periods.
5. Maintenance of waste canister retrievability option.
6. The design and reliability of a long-term repository monitoring network.
7. The maximum expected radionuclide release rate from the engineered system.

In December 1984, the DOE issued a Draft Environmental Assessment for the proposed Yucca Mountain site. Comments of the State, issued in March 1985, cited major deficiencies in the technical assessment of the site. Our analysis concluded that technical evidence was available which suggested that four conditions which could disqualify the site might be present at Yucca Mountain. These four disqualifying conditions were:

(1) Tectonics

The DOE Siting Guidelines for nuclear waste repositories indicate that a site should be disqualified if fault movement and other ground motion would result in loss of waste isolation. The Draft EA acknowledged that Yucca Mountain is in a tectonically-active area and the faults on Yucca Mountain may be "potentially active," but indicated these present no problems for siting a repository at Yucca Mountain. However, the State found that a reasonable interpretation of the available information suggested that a large earthquake with accompanying surface faulting could probably occur during the lifetime of the facility, with the possibility of loss of repository integrity.

(2) Geohydrology

The Siting Guidelines indicate that a site should be disqualified if the groundwater travel time from the repository to the assessable environment is less than 1,000 years. The Draft EA admitted that necessary hydrologic parameters for the unsaturated zone were poorly known and much uncertainty existed in the model calculations, but results indicated groundwater travel times ranging from 20,000 to 50,000 years for the site. However, State calculations, using conservative approximations to bound numerical uncertainty, found that groundwater travel time could range from 900 to 34,000 years. The minimum number for groundwater travel time would not meet the geohydrologic requirement.

(3) Off-site Installations

The Siting Guidelines indicate that a site should be disqualified if atomic energy defense activities conflict irreconcilably with repository activities. The Draft EA stated that there would be no conflict because of engineering design which would accommodate weapons testing effects and coordination of repository schedules with testing schedules would minimize safety concerns. The State found, however, that a repository at Yucca Mountain might conflict with future weapons testing and the established mission of the Nevada Test Site. The State acknowledged that the long-term future of atomic testing was uncertain, but if testing would continue in the future, areas in close proximity to Yucca Mountain would likely be locations for such testing. The State believed this guideline could not be satisfied without documentation from the Department of Defense that future atomic testing would not conflict with a waste repository at Yucca Mountain.

(4) Water Quantity and Quality

The Siting Guidelines indicate that a site should be disqualified if repository activities would degrade water quality or reduce water quantities for human consumption or crop irrigation. The Draft EA found that repository water use would not lower the regional groundwater table or reduce water quality. The State found there was insufficient information provided in the Draft EA to judge the impacts of repository water use on water quantity or quality. Amargosa Valley, down-gradient from Yucca Mountain, could be affected in the long term by degradation of the groundwater by repository activity.

State reviewers identified other areas of technical concern with the Draft EA mineral resource potential, risk of volcanic eruption, possible changes in future climatic conditions, instability of underground repository openings, and flash flood protection.

The Nuclear Regulatory Commission has also expressed concern with the technical suitability of the Yucca Mountain site. In December 22, 1986 letter report to Stephen Kale, Office of Geologic Repositories-Department of Energy, the NRC staff concluded that the Environmental Assessment for Yucca Mountain was overly favorable or optimistic in its technical assessment of the site. While the NRC acknowledged that all information on the site is not yet available, the environment assessment did not acknowledge alternative interpretations which could be reasonably supported by existing data; did not identify the uncertainties associated with the limited existing data base, and it did not consider the uncertainties or alternative interpretations in its evaluations and conclusions.

The same letter report contains nine major comments authored by NRC staff. Three of the comments address faulting at or near Yucca Mountain. NRC staff contends that literature evidence suggests that faults in the vicinity of Yucca Mountain should be considered to be potentially active. The high state of stress measured on Yucca Mountain suggests that north-south trending faults could be reactivated by nuclear weapons tests. Further, the omission of a comprehensive discussion of northeast-trending strike-slip faults reflects an inadequate recognition of the current uncertainties regarding the nature and rates of fault movement. Also the EA failed to acknowledge U.S. Geological Survey literature which suggests that detachment faulting may be a much more important element in the tectonic setting of Yucca Mountain than previously believed.

Another NRC comment raised concern that the potential for hydrothermal activity, which is often associated with volcanic activity, was not addressed in the EA. Staff contends there may be potential for hydrothermal activity and hence the potential for such activity to create new flow paths and adversely affect the waste package.

Staff also raised concern that an analysis of historical mining and prospecting in the area of Yucca Mountain was not sufficient to assess economic potential inasmuch as natural resource exploration has been banned within the Nevada Test Site for over 30 years. The EA did not recognize the direct knowledge currently available about natural resources at Yucca Mountain and overlooked various indirect lines of evidence which suggests the presence of significant economic natural resource potential.

Concern was also expressed by NRC that, because the ability of the geochemical system to effectively retard radionuclide migration was highly speculative, it is not unreasonable to assume significant increases in radionuclide transport to the accessible environment due to change in climate or geohydrologic conditions.

NRC staff also questioned DOE's confidence in the calculation of groundwater travel time. They stated that the "many assumptions, hypotheses, and approaches used in the analysis did not incorporate uncertainties associated with available data." The specific problems relative to the calculation of groundwater travel time are 1) uncertainties affecting the groundwater travel time calculations; 2) uncertainties connected with parameters input to models as random variables, and 3) uncertainty with regard to vertical movement of groundwater. Staff cautioned that the use of 0.5 mm/yr. for an upper bound for flux for groundwater travel time is not substantiated and that higher values should be considered. Their review further suggests that under certain conditions, fractures flow could occur at flux values less than 0.5 mm/yr., thereby producing groundwater travel times of substantially less than 1,000-year travel time required by EPA.

NRC likewise questioned the two mechanisms -- matrix diffusion and sorption -- which would diminish radionuclide releases to the accessible environment and suggest that colloids present in the groundwater may lessen the effectiveness of matrix diffusion for retarding radionuclide transport and may in fact enhance migration. Research described in scientific literature suggests that zeolites and clays are not effective sorbers of plutonium or americium, major elements in radioactive waste.

The NRC's final major concern is that the 3,000-year waste package container life proposed in the EA is neither realistic nor conservative. Research conducted by NRC contractors for a range of simulated Yucca Mountain environments confirms the overestimation of the waste package lifetime. In NRC's view, the EA should fully acknowledge the uncertainties in current waste package analyses and the limited data base available.

In summary, the State of Nevada is in agreement with both the National Academy of Sciences and the Nuclear Regulatory Commission staff relative to concern with the technical adequacy of the Yucca Mountain. Technical flaws appear to be present at the site. These include the occurrence of active earthquake faults at the site, the potential for recurrent volcanic activity within the engineered life of the repository; the potential for significant economic natural resources beneath the mountain; possible adverse affects on repository performance from nearby nuclear weapons tests; and uncertainty about the site's ability to meet the 1,000-year groundwater travel time mandated by the EPA. In the past, the State has attempted to assess the validity of these suspected technical flaws by proposing to perform independent technical studies. Even after the U.S. Ninth Circuit Court of Appeals concluded that the State was entitled to perform such studies as part of its lawful oversight role, DOE has continued to frustrate and delay State grant funding for those studies. The fact that DOE has yet to adequately address crucial and perhaps even disqualifying technical questions may be seen as further evidence of the Department's reluctance to seek answers which may not be to its liking.

ADEQUACY OF FIVE STATES

1. DOE claims that all five of the sites nominated for the first repository are quite adequate to be considered for characterization and that the projected performance of any of these sites will far exceed applicable EPA standards for releases of radioactivity. Isn't this true?

Response: Nevada has no confidence in DOE's claim that all five sites nominated for the first repository are adequate based on "projected performance" of EPA off-site release standards. First, EPA staff has itself admitted that the proposed EPA standard was tested against what was then known about the Hanford site, that the proposed standard was discovered to disqualify Hanford, and that the standard was thereafter altered (made more lenient) so as to permit Hanford's further consideration. Further, the definition of the interior limits of the geographical area to which the standard would be applied were modified to permit DOE to define the "disturbed", or pollutable, area in an amoeba-like or gerrymandered way, permitting extension of interior limits in favor of easier DOE compliance. Additionally, DOE's conclusion with respect to respective sites' performance in relation to the EPA standards was made through the application of DOE's site selection guidelines, which are subjective. A different analyst could easily reach a different conclusion using the same data and the same guidelines.

Specifically with respect to Yucca Mountain, NRC staff has criticized DOE's disregard of active faulting, hydro-thermal activity, the presence of ore deposits at the site, and DOE's over reliance on geochemical retardation, groundwater travel time modeling and an engineered barrier system performance in analyzing the site. DOE's conclusion with regard to the EPA release standard is not well based and is self serving.

2. If DOE's contention is true, what do you think its implications are for site selection?

Response: If DOE's contention is true, that sites chosen essentially at random for their technical isolation properties all meet adequately stringent environmental standards, then the implication for the program is that there are undoubtedly many more such sites in the nation sites, which could be explored in hopes of finding a best site.

"FIXING THE PROBLEM"

1. Suppose you could make a list of the things you'd want DOE to do differently within the framework of the Act in considering the site in your State. Assum that if DOE agrees to make the changes indicated on the list, then you will cooperate in allowing site characterization to proceed. Could such a list be drawn? Or do you just want your site dropped from consideration? If such a list could be drawn, what would be on it?

Response: Nevada believes that the solution to the current problems facing the nuclear waste disposal program lies, simply, in a return to the letter and intent of the Nuclear Waste Policy Act. DOE must be forced to implement the Act as Congress originally intended. While specific deadlines in the Act may no longer be operative (because of DOE's ineptitude in implementing the law to date), the overall framework, philosophy and approach to siting, constructing and operating a waste disposal system remains valid. However, if a solution to the nuclear waste problem is to be found and a repository sited, there must be a commitment by DOE and Congress to a truly objective siting process wherein technical and scientific factors are allowed to dictate the choice of sites.

A list of things Nevada would want DOE to do differently, though not exhaustive, would include the following:

1. Define in advance the technical parameters of a fully engineered high-level radioactive waste geologic repository capable of isolating waste until its radiologic character is benign (i.e. no longer toxic); this is not now explicitly required by NRC and EPA.

2. From that definition, determine the technical parameters of natural hydrologic, geologic, tectonic, geochemical, and seismic systems which would act as a substitute for all of the engineered system. Reduce the technical parameters to quantitative terms and promulgate them as new site selection guidelines. (Retain the current economic, social and political parameters required by Section 112(a) of the NWPA and discard the rest of the current guidelines.) Incorporate within these new guidelines the premise that no site or location is considered suitable until there is evidence which proves that to be the case.

3. Screen the nation's geology for sites likely to possess quantitatively adequate technical parameters without first

considering the socio-political issues of ease of siting or land ownership.

4. Define the safety and health risks of transportation of spent fuel over specific routes.

5. Balance the known information about the technical parameters of each site against the safety and health risks of utilizing those sites and the transportation of spent fuel thereto.

6. Select for characterization all those sites which present promising prospects of significant radionuclide isolation potential which, on balance, present the least health and safety risks prior to repository closure. Commit to selecting only the three best sites from among all available for characterization. Commence characterization of at least three sites so as to comply with the NWPA modified NEPA requirement.

7. Throughout site screening and analysis, (characterization) commencing with systems design, incorporate state and local knowledge of the respective geology. Discover how best to analyze it. Design the research system so that it asks open ended questions and is really inquisitive in nature. Attempt to resolve technical questions about which state and local technical professionals are concerned using the investigative approach or methodology which such professionals believe will resolve their questions. Manage the site screening and characterizations program as close to the site as possible, but integrate this management by means of a single system engineering contractor. Grant on site management personnel the authority to commit and make decisions regarding the program when state or local technical professionals need specific commitments/decisions.

8. Don't hurry against an uncompromising schedule which thereafter becomes compromised at the whim of the program's administrator.

9. Listen to and heed comments and suggestions offered from others.

10. Make decisions in the open.

11. Don't modify results of requested advice to serve preconceived programmatic objectives.

NOT IN MY BACKYARD

1. Every state being considered for a repository knows several reasons why the site should not have been chosen for characterization. What would be your response to allegations that your objections are being raised only to avoid the location of a repository in your state?

If the State of Nevada were to base its case for elimination of the state as a potential repository location on a "not in my backyard" argument, it would probably have a fairly strong case. First, Nevada already bears a major share of the responsibility for the nation's nuclear arsenal in its "backyard". Moreover, 83% of Nevada land is owned by the United States government. Other areas of the country have chosen nuclear power, with its attendant waste problem, as an energy alternative. Nevadans have not. Even those states with nuclear reactors in their front yards argue that nuclear waste should not be buried in their backyard. Yet those states reap the benefits of the nuclear energy.

While Nevada representatives are quick to point out the fact that the State has already done much more than its share to support the nation's nuclear programs, that argument is really only a sidebar to the main issue of concern to Nevada -- the issue of the technical suitability of the Yucca Mountain site. The fact that Nevada has contributed heavily to the country's atomic activities would, obviously, be a factor in the event that Yucca Mountain and one or more sites in other states (without Nevada history of service in this area) were found to be equally the best and most suitable available. At that point, Nevadans would expect Congress to recognize the fairness in spreading the country's nuclear burden more equitably. However, the Yucca Mountain site appears to be seriously flawed and is almost certainly not among the best sites that can be found from a technical perspective.

GARDNER PROPOSAL

1. What is your opinion of Governor Gardner's proposal for a non-binding conflict resolution process to develop a consensus on how to proceed with the program? Would this solve the problems with the program as you see them? Why or why not?

Response: Governor Gardner's proposal is not likely to be implemented as it calls upon parties to negotiate when it is not currently in their self interest to do so. DOE has declined. Second round states perceive themselves better protected by current political power than through negotiation. Governor Gardner's proposal is based on an assumption that the Department of Energy will enter into good faith negotiations with other parties involved in the nuclear waste program. It also assumes that DOE will be willing and able to approach the high-level waste program from a standpoint that eschew political and other non-technical influences that have driven DOE's management of the waste program to date.

DOE has shown little inclination to change its ways. It continues to deny states the funds required to perform adequate oversight and independent confirmatory studies. It persists in limiting state involvement in key decisions and program activities. Nevada has offered to negotiate the issues which underlie the State's legal actions against the Department and DOE has refused. The current DOE-implemented waste program is so flawed that a "conflict resolution" approach is not likely to result in a successful outcome. What is needed is a commitment from the Department to retract the siting decisions that have been made to date and begin the NWPA siting process over again using new, objective siting guidelines and with a stated purpose of finding the best and safest site for a repository.

NEED TO AMEND THE ACT

1. Are you asking Congress to amend the Nuclear Waste Policy Act to address the issues you raised in your testimony? If so, could you describe your proposed amendments to the Act? If not, how do you propose that the Department move forward with the program?

Response: Nevada does not ask for amendment to the NWPA at this time, but rather for Congressional enforcement of the Act. We propose, as a starting point, that DOE be required to promulgate new, adequate and objective siting guidelines and move forward by complying with the law in both letter and spirit.

ECONOMIC BENEFITS

1. What economic (or other) benefits are there for our State or tribe if your site is chosen for the repository?

Response: It is not possible to look at the economic benefits of a repository apart from the potential economic, social, environmental and other costs that may be associated with such a facility. Only after a thorough examination of the cost-benefit ratio has been completed, can a realistic picture of possible repository effects (both pluses and minuses) be obtained.

The Department of Energy has consistently sought to exaggerate the potential economic benefits of a repository in Nevada while ignoring or downplaying the possible negative aspects. The only attempt by DOE to address the economic aspects of repository siting in Nevada is in the Environmental Assessment (EA) for the Yucca Mountain site. That document was seriously deficient in its analysis of economic costs/benefits. State reviewers concluded that the EA presented a "best-case" scenario that minimized potential impacts to the social and fiscal systems of southern Nevada. It ignored risk, assumed unchanging demographics, and proceeded from the premise that all markets function with perfect information. It used a model of questionable validity and ignored relevant differences between two of counties bordering the site (and ignored the rest of the state entirely).

The methodologies employed to estimate such crucial elements of the socioeconomic-impact-analysis formula as direct and indirect labor-force numbers, settlement patterns of immigrating workers, and even the number or percentage of immigrants expected were either lacking altogether or seriously deficient.

Nowhere was the calculation by which DOE arrived at direct repository employment explained. Such calculation is crucial because it drives a number of other key variables in the socioeconomic analysis, including total employment, which, in turn, provides the basis for projecting impacts on local communities (and on the state).

The fact that direct employment at the Yucca Mountain site was initially estimated to be almost 200 percent greater than for any of the other nine sites would seem to indicate that repository employment figures were greatly overstated. The fact that there was no explanation in the EA as to how direct-worker estimates were arrived at may be seen to indicate that the numbers have been intentionally inflated. Such speculation is further fueled by the limited information that is available in reference material relative to labor-force calculations. Those initial estimates contained "contingency" factors of up to 40 percent and inflated employment numbers by another 15 to 18 percent because of the manner by which fringe benefits were incorporated into the equation.

Indirect employment figures were likewise suspect because of the use of a multiplier that was between 2½ and 5 times larger than multipliers employed for any other site. State agency reviewers consistently questioned the applicability of such a large multiplier even for the more cosmopolitan Clark County, which has a more diverse and sophisticated overall labor force than rural Nye County.

DOE consistently focuses on employment and income gains that will occur as the site is developed and just as consistently ignores the declines in employment and the negative impacts on local revenues and markets that could occur as the project moves from construction to operations and from operations to closure.

Another major area where DOE's economic analysis is seriously deficient involves the analysis of potential repository-related impacts on the primary sector of Nevada's economy -- tourism. The tourism analyses contained in the EA and in supporting and subsequent materials are superficial and largely irrelevant. DOE attempted to infer that because impacts on tourism as a result of major hotel fires and the Three Mile Island incident were short-lived and minimal, a repository (and related shipments of nuclear waste passing through Las Vegas over 30 years) will have little effect on the State's tourism industry. Not only is such treatment of this crucial subject inadequate and misleading, but it also fails to differentiate between short-term, crisis-related events and the implications of a project that will be ongoing for 10,000 years. Likewise, any attempt to relate tourism at places like Harrisburg, Pennsylvania, to tourism at Las Vegas is superfluous. As with so much of DOE's work, there is an obvious attempt to treat conjecture and opinion as fact -- and then to infer a lack of negative consequences as a result of such "facts."

Because DOE's conclusions relative to economic benefits/costs associated with a repository are suspect and unreliable, the State of Nevada has undertaken a comprehensive socioeconomic impact assessment study aimed at examining objectively and realistically the possible costs and benefits of a repository in the state. It should be pointed out that, despite the provision of voluminous materials explaining and justifying the State's program, DOE has, to date, refused to provide all of the funds needed for this important study during 1987. DOE's reluctance to adequately support State economic assessment efforts probably says a great deal about the Department's underlying belief as to what the real cost-benefit ratio is likely to be.

2. What discussions have you had with DOE about economic benefits?

Response: The State of Nevada has only discussed potential economic benefits with DOE in the context of commenting on the Environmental Assessment. Until DOE is willing and able to discuss benefits in relation to costs, it is superfluous to attempt any productive dialogue.

Several local governments in southern Nevada have attempted, over the past two years, to ascertain from DOE the materials, equipment, supplies, and services requirements of a Nevada repository in order to help local businesses and industries in the procurement process. DOE has not responded to local inquiries, even though site characterization officially began on May 28, 1986, and exploratory shaft construction is due to start in 1988.

3. Would more serious discussion of potential economic benefits, for both the period of site characterization and construction, increase your state's willingness to go along?

Response: Any discussion regarding economic benefits of a repository in Nevada is extremely premature and detracts from the real issues involved with the siting of a facility at Yucca Mountain. First, as pointed out above, any direct economic benefits of a repository must be balanced with a clear picture of possible economic and other liabilities. Such a balanced analysis is lacking at this time. However, once accomplished, it is likely to reflect a situation where, at best, the costs/benefits are about equal, or at worst, where the economic and other negatives outweigh the potential benefits.

Prospective indirect economic benefits associated with a state's acceptance of a repository -- such as linking the supercollider project to the repository represent a somewhat different situation. Here we are talking about compensation to one state for accepting something other states are unwilling to accept but is in the nation's interest to develop. Such an approach would certainly sweeten the deal for a state ultimately selected for the repository. However, in Nevada's view, discussion of linking the supercollider project or any other such compensatory project to the acceptance of a repository by any state before the site within that state has been proven to be technically suitable for isolating the extremely toxic nuclear materials to be disposed of there, is not only inappropriate but even irresponsible.

The Nuclear Waste Policy Act requires that technical factors relative to site suitability be the predominant criteria by which a repository location is selected. To offer economic benefits and compensation to a state before a repository site has been deemed suitable -- or, in the case of Nevada, where the Yucca Mountain site has been shown already to have potentially serious flaws -- is to infer that the technical viability of a site is less important than political and other considerations. Nevada believes that such an approach will only confuse the important issues surrounding site selection and could have disastrous consequences should a technically inferior site ultimately be chosen as a result of the emphasis placed on economic benefits and compensatory factors.

LAWSUITS

1. What are the main contentions in lawsuits that you have filed against DOE concerning the nuclear waste program? Please provide a list of the pending lawsuits, where they are filed, and the status.

Response: Nevada is petitioner in the following lawsuits, all filed in the Ninth Circuit Court of Appeals:

1. Nevada v. Herrington, 777 F. 2d 529, (Ninth Cir. 1985). the Court found in Nevada's favor regarding funding for independent technical studies under Section 116(a) of the NWPA. DOE has not yet funded several of these studies.

2. Nevada v. Herrington, No. 85-7308. This action challenges the adequacy of U.S. DOE's siting guidelines under Section 112(a) of the NWPA (consolidated with EPI v. Herrington, No. 84-7854).

3. Nevada v. Herrington, No. 86-7307, challenges procedures used to nominate, recommend and obtain Presidential approval of sites for characterization.

4. Nevada v. Herrington, No. 86-7308, challenges the Secretarial decision to characterize Yucca Mountain without first obtaining Congressional withdrawal of land pursuant to Federal Land Policy and management Act.

5. Nevada v. Herrington, No. 86-7309, challenges the legal adequacy of the final Environmental Assessment for Yucca Mountain under Section 112(b) of NWPA.

6. Nevada v. Herrington, No. 86-7310, challenges the Secretarial preliminary determination of suitability under Section 114(f) of NWPA.

7. Nevada v. Herrington, No. 86-7311, challenges the Secretarial denial of funding under Section 116(a) and (b) of the NWPA for judicial review of Secretarial action under Section 119(a) of the NWPA. Oral argument was held on February 12, 1987, and the case is now under advisement.

RESPONSES TO QUESTIONS POSED BY SENATOR JAMES McCLURE

1. Is there anything we, as Congress, or that the Department, could bring to the nuclear waste disposal process, that would shift the focus away from the litigious confrontational bind we now find ourselves in, and towards a more productive and constructive avenue?

Response: This question poses an interesting distinction between the objective, scientific and technical resolution of problems and the political, legal and regulatory resolution of problems. It is noteworthy that the basic argument contained in most of the lawsuits filed against the Department of Energy assert the Department's failure to use the scientific, objective or technical approach. If Congress believes that the scientific and objective approach is the better one, and certainly it is the approach preferred by the Nuclear Waste Policy Act, then Congress should demand that approach of DOE as the states have been doing for several years.

The Department made its first major departure from the scientific approach when it elected to develop subjective siting guidelines. The current DOE siting guidelines are flawed from both a scientific and a logic perspective. The guidelines operate on the illogical premise that all sites and locations are considered suitable until the evidence proves that this is not the case. Not only does this faulty approach defy logic and sound scientific methods but it has the effect of shifting the burden of proof regarding the suitability of a given site from the Department to someone other than DOE, such as the State or the NRC. DOE uses the fact of a lack of (or paucity of) data as a tool to confirm the predetermined suitability of the existing sites. The Department compounded this problem by proceeding to select sites for characterization on the basis of political and ease-of-siting considerations (sites which were owned by the government in states with little political resistance capability), thereby assuring that its two preferred sites (Yucca Mountain and Hanford) were chosen for characterization.

The best way for Congress to bring the nuclear waste disposal program out of its litigious confrontational bind is to cause the program to be conducted in accordance with the law. In the event that Congress cannot or will not do that, the states' only remedy is in the courts.

Congress can begin to resurrect the program by directing DOE to develop new, objective and technically-scientifically base siting guidelines and then apply those guidelines in a truly objective site screening process as provided for in the Nuclear Waste Policy Act. Congress must also direct DOE to comply with the Act in all other respects including the requirement to identify potential second repository sites and the stipulation that the Department consult and cooperate with affected states and tribes. If Congress can see to it that DOE conducts a site selection program aimed at finding the best and safest repository site (not one that is only marginal or acceptable), and if that program is conducted according to impeccable standards of objectivity and scientific justifiability, the state ultimately found to contain such a site would find it very difficult to challenge the legitimacy of the selection process. However, as long as DOE is allowed to run roughshod over the Act's requirements for the pre-eminence of scientific and technical factors in site selection, the program will continue to be crippled by lawsuits and other forms of protest by states, tribes, interest groups and concerned citizens.

2. It is my understanding that C & C (Consultation and Cooperation) negotiations are now totally deadlocked. Could you provide the Committee with evidence that you have made good-faith efforts to sit down with the Department to hammer out a C & C agreement? How would you characterize these efforts to date? What would it take to bring you back to the table at this point?

Response: It is correct that the consultation and cooperation agreement negotiations are not moving. The reason for Nevada's reticence to negotiate a C&C Agreement at this time is that the Department has failed to deal constructively and honestly with Nevada, and has violated the statute. We see no valuable objective in spending time discussing details of program administration when there is such extreme disagreement on basic principles of the statutory compliance. On December 16, 1986, Governor Bryan communicated the State's position regarding consultation and cooperation to the Secretary. A copy of that correspondence is attached. DOE has, to date, shown no interest in negotiating the points raised in the Governor's letter.

3.a. The site characterization process is estimated to cost upwards of $1 billion in each of the three states under consideration for the first repository. Has your state considered the economic benefits that such a undertaking might provide?

Response: The State of Nevada is looking very carefully at the potential economic benefits and costs associated with site characterization. The fact that DOE estimates it will cost $1 billion to characterize the Yucca Mountain site, in no way means that the State of Nevada will realize substantial economic (i.e., monetary/employment) benefits. Indications are that very little in the way of site characterization benefits will accrue to the state or to local communities. DOE's own estimates indicate that, at most, 273 workers will be employed during characterization. That represents something like two tenths of one percent of the work force in the two-county area surrounding the site, assuming that all 273 jobs are filled by new workers. However, DOE expects that sixty percent (60%) of those 273 jobs will be filled by workers already employed at the Nevada Test Site. Consequently, the employment benefits of site characterization are so small as to be insignificant.

DOE has yet to provide the State with any information concerning other in-state expenditures that may result from site characterization (i.e., construction supplies, materials, services, etc.) despite repeated requests for such data. However, we assume that supplies, equipment and the like will be procured on a low-bid basis. It is very likely that most of the "benefits" resulting from such procurements will accrue to large suppliers, companies and organizations outside of Nevada simply because of existing economies of scale.

A great deal of the estimated $1 billion characterization costs can be expected to go to long-time DOE contractors located in other states. As a result, Nevada institutions can expect to see relatively very little in the way of technical or research dollars that might be available.

In summary, it has been DOE's policy to stress the potential economic advantages of site characterization (as well as subsequent construction and operation of a repository). In fact, DOE has not done an accurate assessment of the economic costs and benefits with regard to characterization. However, DOE's own conclusions, as reflected in the Environmental Assessment for the Yucca Mountain site and the Draft Socioeconomic Monitoring and Mitigation Plan, indicate that economic benefits to the State are likely to be insignificant or non-existent.

3.b. If what you claim about the technical flaws of yours site is indeed true, then wouldn't the best proof of that claim be the real, scientific findings that would result from such an undertaking? So you would win on two fronts" (1) substantial monetary and employment benefits to the State, and (2) scientific substantiation that your sites are unsuitable for nuclear waste disposal.

Response: As noted above, the relationship between site characterization work and economic benefits to the State or local communities is not likely to be significant. More importantly, the fact that DOE spends money on characterization activities does not automatically mean that crucial technical issues relative to the Yucca Mountain site will be answered -- or even adequately addressed. DOE has attempted to avoid addressing some of the more fundamental technical issues for years and has tried to prohibit the State of Nevada from conducting studies aimed at generating needed technical data.

An example of DOE avoidance of key suitability issues while forging ahead with expenditures of research funds at Yucca Mountain involves recommendations made by the National Academy of Sciences in 1979 relative to the potential suitability of tuff as a host medium for a repository. NAS advised DOE that five issues needed to be addressed before major resources are committed to a tuff site (such as Yucca Mountain). Those issues involved the seismic and volcanic stability of the site; lateral variation in thickness and character of the tuff; the fact that tuff terrains are typically broken by faults into blocks; the stability of tuff in the presence of elevated temperatures; and the presence of natural resources associated with tuff formations. Despite the expenditure of millions of dollars since 1979, DOE has yet to adequately address these key issues raised by the NAS. Given DOE's track record in conducting (or avoiding) site suitability investigations at Yucca Mountain, and the fact that the economic benefits to Nevada from characterization are likely to be insignificant (with major outlays of funds going to out-of-state contractors and suppliers), rather than "win on two fronts," Nevada is likely to be shortchanged in both instances.

4. Besides the influx of jobs and money directly associated with site characterization, what other socio-economic benefits would you consider as essential to your State's full cooperation in the site selection process?

Response: Nevada believes that it is currently cooperating fully in the site selection process. It is the State's role, as prescribed by the Nuclear Waste Policy Act, to monitor and oversee DOE's siting activities and assure that the conclusions drawn and decisions reached are appropriate and sound and that the health and safety of the citizens of the state are being adequately protected. Nevada has consistently striven to carry out that role.

Additional socioeconomic benefits for the State will not "fix" the site selection process simply because Nevada and the other potential host states are not the problem. The question infers that state "cooperation" to date has some how been lacking and economic "sweeteners" might promote less aggressive state oversight. The problem to date has been DOE's refusal to follow the letter and spirit of the Nuclear Waste Policy Act. In instance after instance, DOE has attempted to use the Act to ratify predetermined decisions. Had the Department heeded state's concerns over the inadequacy of the siting guidelines -- the first major decision document developed under the Act -- many of the current siting problems would have been avoided. If DOE had done a scientifically objective job of screening and ranking sites instead of manipulating the site selection methodology to assure that the Hanford and Yucca Mountain sites would be included in the top-three sites, it would not now be accused of blatant mismanagement of the program. Likewise, if DOE had followed the letter of the law and not attempted to eliminate the second repository program for political reasons, the Department would not be accused of bringing the entire repository program to the brink of disaster.

Nevada has and will continue to fully cooperate in the repository siting program. However, the State cannot and will not, for the sake of economic benefits, roll over and abdicate its responsibilities to assure that DOE's work and decisions are adequate, legal and scientifically justifiable. Until such a time as a site is shown beyond doubt to be technically suitable, the question of economic benefits is and must remain superfluous.

5. In your opinion, would earlier, greater involvement by NRC and EPA help restore your confidence in DOE's program?

Response: Earlier and greater involvement by the Nuclear Regulatory Commission and the Environmental Protection Agency would have created better confidence in DOE's program, but only if both of those agencies were free to act as checks on DOE's program. There is a major institutional problem in assigning the mission function for the development of a major public works project with significant environmental implications to one federal agency while its sister agency (NRC) must measure the radiologic health and safety risk of the project and approve its construction. Only if the NRC is in a position to freely judge the proposal will public confidence be enhanced.

The NRC's evaluation and concurrence in DOE's siting guidelines is a case in point. NRC's staff certainly realized that objective siting guidelines would be preferable in developing information with which to evaluate the merits of competing sites. But the NRC commissioner's political deference to a sister agency within the same administration caused the Commission to concur in the guidelines notwithstanding their subjectivity. This institutional problem identifies a major state question with respect to NRC repository licensing. Will the Commission again defer to the political and institutional momentum engineered by its sister agency, the Department of Energy, if that department submits an inadequately supported application for licensing?

6. How would you characterize your relationship with DOE to date? What could be done to improve your ability to work with, communicate with, and provide advice to DOE?

Response: Nevada's relationship with DOE relative to the high-level waste program is difficult to characterize simply. In general, the state has enjoyed a fairly good working relationship with the DOE project office in Las Vegas. On numerous occasions, State officials and DOE/Nevada representatives have been able to work out agreements on difficult and potentially contentious issues, only to have those agreements vetoed by DOE/Headquarters personnel.

The State's relationship with the Office of Civilian Radioactive Waste Management (OCRWM) in Washington, D.C. has been considerably more negative. It is the State's contentions that DOE/Headquarters decision makers tend to view State-DOE relationships in a much more adversarial manner and see the State solely as an obstacle in the path of its repository program. DOE/Nevada officials, on the other hand, appear to understand and, in many cases sympathize with State issues and concerns.

An example of the divergent perspectives held by DOE/Headquarters and DOE/Nevada with regard to a key area of State concern involved the State's contention that it needed to conduct independent technical studies as part of its oversight function. State and DOE/Nevada officials were able to reach agreement on the State's proposed technical work and even signed a protocol allowing Nevada's activities to begin. However, the agreement was summarily vetoed by OCRWM headquarters staff, precipitating an extended legal fight which resulted in the affirmation of the State's right to conduct such studies. Had DOE/Headquarters followed its project office's advice and recommendations, a lengthy and unnecessary legal battle could have been easily avoided.

Nevada believes that much of the difficulty that now exists in the relationships between DOE and the states could be eliminated if DOE project offices were given more authority and latitude in addressing state concerns. DOE Headquarters officials informally state that they expect state/DOE relationships to be constantly and predictably adversarial, and that states are bent on derailing the repository program. Given that attitude and the fact that more and more programmatic authority is being centralized in Washington, D.C., Nevada does not expect that more effective or meaningful Departmental consultation or cooperation will be forthcoming in the foreseeable future.

7. Have any of you taken the time to study the process by which the State of New Mexico negotiated and implemented than version of a "C & C agreement" with DOE for the waste disposal activities taking place at the Waste Isolation Pilot Project near Carlsbad, New Mexico? Have any of you visited the WIPP facility, or talked with the state government and environmental representatives in New Mexico to learn from their experiences?

Response: Nevada has indeed studied the process by which the State of New Mexico negotiated and implemented its version of a C&C agreement for the Waste Isolation Pilot Project. You may recall that agreement was written as a stipulated resolution of a lawsuit. It was not written because of the willingness of the federal government to cooperate with the State of New Mexico. From the beginning, its execution was not wholly satisfactory to the State of New Mexico, and subsequent litigation was necessary to resolve additional issues upon which the federal government and state did not agree. The State of New Mexico is continuing to assert its dissatisfaction with DOE's interpretation of the agreement with respect to transportation issues.

Nevada has worked closely with representatives of New Mexico's Environmental Evaluation Group (EEG). In fact, Nevada transportation representatives are, at the present time, working with New Mexico officials in an attempt to require DOE to adhere to the letter and spirit of the New Mexico C & C agreement governing the transportation of waste to the WIPP facility. As it has done with regard to the Nuclear Waste Policy Act, DOE is attempting to interpret the New Mexico agreement to suit its (DOE's) own purposes and is reneging on commitments relative to transportation issues and to the application of EPA performance standards to the WIPP facility.

Nevada does not view the DOE/New Mexico C & C agreement as a model accord for a potential repository state. The New Mexico agreement was not something the state entered into willingly or as a consequence of its rights under law. The agreement represents the best New Mexico could do under a very difficult set of circumstances wherein DOE was able to ride roughshod over state concerns and interests until a court decision finally gave New Mexico a certain amount of leverage.

Nevada views its role under the Nuclear Waste Policy Act as significantly different from and more substantial than New Mexico's role vis-a-vis the early days of the WIPP project. Consequently, any C & C agreement (or even the negotiations needed to reach such an agreement) must be based on a mutual acknowledgement of the importance and substance of the state's rights and responsibilities under the NWPA.

8.a. Most of you have read GAO's draft report on "Institutional Relations." This report was done at the request of this Committee, and should be available in final form by the end of this week. What is your opinion about the conclusions and recommendation in this report?

Response: We believe that the conclusions and recommendations made by the GAO are a good first step to improve institutional relations between the states/tribes and the Department. However, they fall short of really attempting to define the problem and make significant recommendations. The conclusions and recommendations are focused on the symptoms of the problem rather than the problem itself. Additionally, the attempt to characterize the concerns of the states and tribes as dissatisfaction and disenchantment grossly understates these concerns.

8.b. If the recommendations in this report were implemented, would this significantly improve the prospects for success of the Program?

Response: The recommendations contained in this report, if implemented, would do little to improve the prospects for the success of the program in that the GAO fails to recognize and address the fundamental underlying problem with the program.

It is Nevada's contention that the finely crafted relationship established between DOE and the states in the Act has not been fully realized, and that this situation threatens to render the purpose and framework of the Act inoperative. We further contend that the cause of this failure rests strictly with the Department of Energy and stems directly from DOE's inability or unwillingness to understand the fundamental nature of the state/federal (i.e., DOE) relationship under the Act. For whatever reason, DOE has chosen to pursue its role as program decision maker with relish -- as it has every right and responsibility to do. However, at the same time, the Department has attempted, at nearly every opportunity, to thwart the states' efforts to fully exercise their obligations as guardians of the public interest. Unless balance is restored and restored quickly to this critical relationship, DOE will find itself in a situation where it is unable to develop the level of public confidence essential to success in this controversial undertaking.

What DOE has failed to grasp in over four years of NWPA operation is states such as Nevada do not exist simply as obstacles in the path of its repository program. We have a role to play that is every bit as crucial as DOE's. While state relationships with DOE are and should be adversarial, it is only out of this adversity that a firm basis of public confidence in DOE's handling of the waste program can emerge.

DOE's waste management actions and decisions since 1983 present very clear evidence that the Department has never grasped the significance of the states' role in furthering the Department's own interests and purposes under the Act.

From the beginning, the Department has attempted to frustrate state involvement in the siting process. In developing its guidelines for siting high-level nuclear waste repositories, DOE engaged in an elaborate exercise wherein states' input was solicited only to be disregarded when it did not coincide with preconceived DOE decisions about how the site selection process should be handled. The result was a set of siting guidelines that are overly subjective and which failed to adequately discriminate between potential sites when applied in the various Environmental Assessments. Had DOE heeded state concerns about the guidelines early on, it would not have been faced with a situation where it was trying frantically to build objective technical measures into a set of standards that are inherently flawed. Instead, DOE now faces litigation by numerous states and interest groups relative to the adequacy of the guidelines.

The Draft EA's themselves are another example of DOE intransigence when it comes to state involvement in key decision areas. Nevada and other states consistently asked DOE for nearly two and one-half years for the opportunity to participate in the development of the Draft EA documents, especially in the design of the ranking methodology that would be used to discriminate between sites. DOE steadfastly refused to allow states the opportunity to influence the form or substance of those documents until they were issued in draft form and until DOE was already so committed to decisions relative to content, methodologies, and the like that it was unable to give more than lip service to state concerns as finally expressed in formal comments. The result -- environmental assessments that are inadequate for substantiating DOE claims relative to site suitability and which bind the Department into an inflexible and extremely limited view of the various sites under consideration. Instead of public confidence and acceptance being enhanced by the EA's - DOE is left to defend a set of decision documents that are themselves objects of skepticism and public derision.

DOE's management of the nuclear waste fund has likewise been aimed at limiting, whenever and wherever possible, state access to funds needed to fully carry out NWPA responsibilities. DOE's performance in this regard is especially reflective of how the Department has approached other key aspects of the repository program. Simply put, DOE interprets the Act according to its own interests regardless of the intent of Congress or even the letter of the law itself. The recently decided lawsuit brought by Nevada over the State's right to use waste fund monies to conduct independent, confirmatory studies relative to site suitability is an excellent example of this DOE "stonewalling" strategy. Ignoring the language of the Act and the obvious intent of Congress that potential repository states be able to engage in reasonable studies and other activities to assure that DOE's conclusions about the suitability of sites are, in fact, accurate, DOE issued a set of internal policy guidelines that expressly prohibited states from conducting any such independent analyses. When the Ninth Circuit Court of Appeals clearly decided the matter in Nevada's favor, saying unequivocally that "because DOE's guidelines seek to 'minimize' independent collection of primary data, and require DOE approval before any federally funded tests can be run on the primary data that DOE has collected, they undermine the independent oversight role that Congress envisioned for the states," DOE immediately attempted to again thwart Nevada's efforts by issuing new "Guidelines" that require new and different hoops for the state to jump through. Meanwhile, the state falls further and further behind in its ability to oversee DOE technical efforts relative to the Yucca Mountain site, and the public is left with the indelible impression that DOE has something to hide -- that it fears its technical work and conclusions will not stand close scrutiny.

As I pointed out earlier and as the examples I've cited demonstrate, the DOE approach to implementing the NWPA has been to interpret the Act only in ways that support pre-Act siting decisions and to limit and interfere with the role prescribed for potential repository states. What DOE has failed to grasp is the essential element of mutuality between DOE and these states. Nevada contends that the Act and DOE will be successful only to the degree that the states are successful in carrying out their role as overseers and custodians of the public interest. DOE and potential host states may be adversaries, but we are both necessary for the success of the repository program.

THE STATE OF NEVADA
EXECUTIVE CHAMBER
Carson City, Nevada 89710

RICHARD H. BRYAN
Governor

TELEPHONE
(702) 885-5670

December 16, 1986

The Honorable John S. Herrington
The Secretary of Energy
U.S. Department of Energy
Washington, D.C. 20585

Dear Mr. Secretary:

I have reviewed Mr. Rusche's November 19, 1986 letter seeking to enter into a binding written agreement with the State of Nevada pursuant to Section 117(c) of the Nuclear Waste Policy Act, 42 U.S.C. 10137(c). His letter proposes commencement of negotiations with a "team" of Department of Energy personnel headed by Mr. Don Schueler, Deputy Manager of the Nevada Operations Office.

I believe that the concept of the development of a written agreement between an affected State, such as Nevada, and the Department of Energy, as originally envisioned by Congress, has considerable merit and Congress should be commended for their foresight in this regard. However, I do not believe that Congress or any of the affected states envisioned that the Department of Energy would have acted irresponsibly and illegally in implementing the Act as has now become so apparent.

As you know, I, along with the Attorney General and the entire congressional delegation have filed actions challenging the legality of nearly every major decision that the Department has made in this program. These challenges are supported by a broad spectrum of the citizens of Nevada. These actions challenge the validity, as well as the legality, of this program,

and to the extent that they are successful, major program decisions regarding site selection that you have made may be declared null and void and the entire siting process restarted. This may include the development of new siting guidelines, rescreening for potentially acceptable sites, the development of new environmental assessments, and restarting the second repository program.

Given the way in which the department has implemented the Act, it is now impossible for the State of Nevada to have confidence or trust in any negotiations with the Department of Energy regarding the implementation of the balance of the program until the uncertainties surrounding the aforementioned concerns are resolved by the courts, Congress or by the Department.

To the extent that our concerns regarding the legality of the siting guidelines, the site selection process, the environmental assessments and the timing of the preliminary determination of suitability required by Section 114(f) of the Act and the second repository program are negotiable, then perhaps discussion regarding a possible written agreement may be appropriate, and I'd appreciate your consideration of those matters.

Additionally, the manner in which the Department of Energy has treated the State of Nevada in attempting to consult and cooperate, as required by the Act, has compounded this situation. The Department has conducted its grants application process in an arbitrary fashion. As you know, Nevada has been forced to seek review by the courts of the way in which the Department has used the grants process to limit the State's participation in the program, and it appears that, even though the court ruled in our favor, we now may be forced back to court over our current grant application.

This lack of cooperation also diminishes our confidence that the Department would honor the terms of a written agreement any more than it has lived up to the statutory requirements of the Act. Should the Department be sincerely interested in consulting and cooperating with the State of Nevada, it can demonstrate that commitment by fulfilling our grant request without the continuing difficulties which has been present in nearly every one of our past, as well as our current, grant requests.

I'd appreciate your consideration of these concerns, and I would be happy to provide any further information you may require. Robert Loux, Director of State Nuclear Waste Project office will be available to discuss our concerns with Mr. Rusche or Mr. Schueler at any mutually convenient time.

Sincerely,

RICHARD H. BRYAN
Governor

RHB/dkl

cc: Mr. Ben Rusche
Mr. Don Schueler
Mr. Grant Sawyer

CONFEDERATED TRIBES OF THE UMATILLA INDIAN RESERVATION

RESPONSE TO SENATOR McCLURE

1) By the very nature of our political process and our democratic structure, our society tends to depend more on the legal procedure, the hearing, the regulation, and the lawsuit, than it depends on the science, the technology, or the actual physical process of working through a problem. (Witness over 30 lawsuits now pending against DOE concerning the Nuclear Waste Program.)

Is there anything that we, as Congress, or that the Department, could bring to the nuclear waste disposal process, that would shift the focus away from the litigious, confrontational bind we now find ourselves in, and towards a more productive and constructive avenue?

Response

In the NWPA, Congress charged DOE with siting nuclear waste repositories in a manner that integrated science and legal procedure so as to protect public health and safety and the environment and to cultivate public confidence in the siting of these facilities. The repository program is mired in litigation and has incited widespread public cynicism because DOE has manipulated the science and ignored the legal procedure required under the NWPA. Since DOE has failed to consult with affected parties or ignored their input, litigation has proved the only recourse to affected parties able to afford it. Let me note at the outset that the CTUIR has not sought judicial review of DOE actions to date in large part because the Tribe is unable to afford the litigation costs.

When Congress passed the NWPA, it recognized the widespread public concern about radioactive waste management. Because of the intense public concern, use of the courts by parties opposing nuclear waste facilities may be inevitable. DOE will fare poorly in these cases because the Department has manipulated data and violated the NWPA in decisions affecting both the first and second repository programs. Public confidence in the repository program will suffer accordingly.

DOE has resisted calls by affected parties for changes in the manner in which the Department discharges its responsibilities under the Act. It seems doubtful DOE will implement a mid-course correction because of internal pressure. Even if it did, however, DOE's credibility has been tarnished so badly over the past 3 years, it may be too late regardless of what DOE does.

Clearly Congress needs to address the confusion in the repository program. The CTUIR suggests Congress take the following action:

a. Site specific work at the three sites selected for characterization for the first repository should be brought to an immediate halt.

b. Site selection for the first repository must be done over again. We should take advantage of the lessons we have learned from DOE's mistakes. Site selection should be resumed under siting criteria that are more objective and provide DOE no room for manipulating data to arrive at pre-determined decisions.

c. The development and implementation of the methodology used to select sites must involve the participation and oversight of potentially affected states and Indian tribes. Congress may also consider the creation of an independent panel of experts to oversee the siting process. DOE has attempted to capitalize on the National Academy of Science review of the Multiattribute Utility Analysis in which the NAS concluded the methodology was state of the art. However, the NAS did not review the actual use of the methodology to select the 3 sites for characterization. Any panel of experts must review the methodology used to compare the different sites as well as the use of the methodology to select sites. This oversight would avoid the manipulation of the methodology by DOE that was revealed in the Markey-Weaver Report last October.

d. The second repository program should be resumed. It seems generally accepted that states (but not tribes) with sites under consideration for a second repository had adequate opportunity to provide input into the Draft Area Recommendation Report. Therefore, the second repository program should resume where it was left last May.

DOE justification for postponing the second repository program should be ignored. The political compromise that produced the NWPA was premised on a 2 repository system balanced geographically. The political acceptability of the first repository in the West will be hopelessly lost if DOE's decision to illegally postpone the second repository program in the East is allowed to stand. In the event Congress decides only one repository is needed in the near term, then the selection process for the first repository must include a consideration of the crystalline sites.

e. The NWPA should be amended to clearly state the authority Congress intended for affected Indian tribes under the Act. The role and authority of affected Indian tribes has been the source of constant friction with DOE. Responses to questions 2 and 6, below, further discuss problems the CTUIR has encountered. The legislative history of the NWPA clearly indicates that Congress intended affected tribes to be treated as affected states were. DOE has been unwilling or reluctant to acknowledge this. The CTUIR would be pleased to provide specific suggestions on the ambiguous provisions needing clarification.

2) It is my understanding that C&C (consultation and cooperation) negotiations are now totally deadlocked. Could you provide the Committee with evidence that you have made good-faith efforts to sit down with the Department to hammer out a C&C agreement? How would you characterize these efforts to date? What would it take to bring you back to the table at this point?

Response

The CTUIR has been actively engaged in the C and C process since August 1985 when we initiated negotiations with DOE. Since that time, seven negotiation sessions have taken place. The CTUIR entered negotiations with a lengthy draft agreement which we have revised eleven times as a result of negotiations with DOE and internal discussions with Tribal leaders. We terminated negotiations in January 1987 because of DOE's narrow interpretation of the rights of affected Indian tribes under the NWPA. Administratively, the DOE negotiating team has not been well prepared or cohesive, and opens challenges to sections of the draft agreement presumed to have been put to bed. The DOE has not, to date, faced the difficult issues of the extent of Tribal participation and oversight during the site characterization phase, the flexible financial clause provisions or the dispute resolution process. Further, the DOE budgeting process, to date, has been inconsistent and so short term as to preclude the CTUIR establishing a continuous, planned, long-term program and with the staff we need to perform our oversight function. Attached is our Report to Congress, dated January 1987, which more fully outlines the history of our negotiations with DOE and why we terminated those negotiations.

In light of the mistrust we have concerning DOE's implementation of the NWPA, returning to the negotiating table may be difficult. DOE has frustrated the public participation and confidence Congress found essential in the NWPA.

The CTUIR would be willing to return to the negotiating table under the following conditions:

a. That DOE is committed to implementing the NWPA as Congress intended.

b. A recognition in writing from DOE that affected Indian tribes are entitled to similar authority as states in the repository program.

c. A commitment in writing from DOE that ambiguities in the NWPA concerning the authority of affected parties will be liberally construed as Congress commanded in the legislative history. This principle is especially important for affected Indian tribes which do not host a repository on their reservation. The NWPA is contradictory at times as to what authority such an affected tribe has. Compare Section 118(b)(3)(A) and (B) concerning impact assistance. Or, the Act sometimes fails to mention tribes at all where it is clear affected tribes need to be included. See Section 117(C)(5-9) concerning C and C Agreement procedures. The Senate Energy and Natural Resources Committee Report on the Senate predecessor bill to the NWPA said that states and tribes "should be entitled to the broadest possible rights and opportunities to participate in the development of the facilities... The Committee expects this fundamental principle to govern any interpretation, including judicial interpretation..." of the Act. S.Rep. No. 282, 97th Cong. 1st Sess. 28 (1981). The Ninth Circuit cited this legislative history with approval in State of Nevada ex rel Loux v. Herrington, 777 F.2d 529, 533 (9th Cir. 1985). DOE has refused to recognize this rule of construction in the past and many disputes concerning tribal participation have arisen as a result. We will not negotiate any further with DOE until their position on this important matter changes.

d. DOE must recognize that the function of a C and C Agreement is not to merely restate the terms of the NWPA. Nor is such an agreement limited to the procedures set out in Section 117(c). The CTUIR has always maintained that Section 117(c) sets the floor for a C and C agreement, not the ceiling. Congress intended the agreement to reflect and respond to the interests and concerns of the affected party. CTUIR interests involve our Treaty of 1855, federal Indian law principles, the federal trust responsibility for

Indian rights and resources and other federal legislation protecting Indian rights. DOE has been reluctant to include C and C provisions that rely upon this authority because it lies outside the NWPA. The CTUIR has demanded that DOE recognize that Indian tribes are unique entities with special legal and political authority. Simply put, we will insist that DOE agree in writing that the terms of Section 117(c) were not intended to restrain the scope of a C and C Agreement.

3) The site characterization process is estimated to cost upwards of $1 billion in each of the three States under consideration for the first repository. Has your tribe considered the economic benefits that such an undertaking might provide?

Furthermore, if what you claim about the technical flaws of your sites is indeed true, then wouldn't the best proof of that claim be the real, scientific findings that would result from such an undertaking? So you would win on two fronts: (1) substantial monetary and employment benefits to the tribe, and (2) scientific substantiation that your sites are unsuitable for nuclear waste disposal.

Response

The CTUIR has considered the possibility of economic benefits associated with the characterization of the Hanford site.

Our review of the available information leads us to conclude that Tribal members will not realize any economic benefit from site characterization activities at Hanford. In any event, regarding the question of "technical flaws" in the candidate repository site, the CTUIR has several concerns. There is ample evidence that the DOE failed to consider available scientific information on several important aspects of the Hanford site, such as potential hydrocarbon and geothermal resources that could possibly disqualify the site. Second, DOE ignored portions of its own siting standards and guidelines in the nomination of the Hanford site. While the CTUIR feels that characterization of Hanford would provide further substantiation of our claim that Hanford should not be selected for a repository facility, we also feel that no one benefits from characterization of a site that ranked last by DOE's own analysis by several orders of magnitude. The result may well be the $1 billion characterization of a site that cannot be licensed and which causes further erosion of public confidence in DOE's repository siting decisions.

4) Besides the influx of jobs and money directly associated with site characterization, what other socio-economic benefits would you consider as essential to your tribe's full cooperation in the site selection process?

Response

Question 4 assumes that the CTUIR will enjoy substantial employment and other economic benefits as a result of the characterization of Hanford. As previously indicated, this does not appear to be the case.

CTUIR cooperation in the site selection process depends upon the following conditions:

a. Utilization of a site selection methodology based upon clear and concise guidelines and siting decisions based on technical merit rather than political and programmatic expediency;

b. DOE's recognition of the oversight authority of affected Indian tribes in the repository program and that that authority is equal to that of affected states; and

c. DOE's recognition that it has bears the Federal Government's fiduciary duty to protect the reservation and resources of the CTUIR.

5) In your opinion, would earlier, greater involvement by NRC and EPA help restore your confidence in DOE's program?

Response

NRC and EPA involvement has been appropriate to date. Greater NRC involvement in the siting process would compromise the Commission's licensing authority under the NWPA. Our limited relationship with the NRC has been cooperative and productive. NRC seems to understand the consultation requirements under the NWPA better than DOE as evidenced by their proposal to engage all affected parties in negotiated rulemaking to develop the Licensing Support System to manage the data relevant to repository licensing.

Greater EPA involvement may be desirable. Since issuing the regulatory standards for repositories, the agency has not been actively involved in the repository program. An EPA representative could be useful as a participant on an independent board of experts overseeing DOE site selection and characterization activities should one be established.

However, the CTUIR feels that DOE's failures in implementing the NWPA cannot be properly remedied by greater involvement by the NRC or the EPA. Our concern has been the necessary involvement by the Tribe as an affected party early on in the process to assure that our concerns are properly addressed and that we have the opportunity to independently evaluate the elements we feel most important to our interests, so that we understand the proposal and have the opportunity to input into the decision-making process. If allowed to participate in this mode we feel that many of our concerns can be addressed prior to the regulatory phase of the project.

6) How would you characterize your relationship with DOE to date? what could be done to improve your ability to work with, communicate with, and provide advice to DOE?

Response

Our relationship with DOE, to date, has been strained and frustrating. Although the NWPA has provided an opportunity for affected parties to participate in the decision-making process and provides for the affected parties to develop their own independent information pertinent to their own particular concerns to allow meaningful participation, this has not always been possible. DOE has not been able to grasp the role provided by Congress to the affected parties and tends to treat them simply as grantees to participate as DOE sees fit. DOE needs to better understand this affected role as provided in the Act, as the affected parties have a defined participatory role to protect their interests and to provide the basis for communicating their concerns during the preregulatory phase of the project to attempt to avoid unnecessary conflict as the project proceeds.

The DOE needs to better understand the necessary input from the affected parties and the importance that this input can mean to the overall project instead of operating similar to how the defunct Atomic Energy Agency did in the past in assuming anyone outside the Agency was a threat to their mandate and had no real place in the decision-making process. It appears to us that this attitude prevails in the DOE and is partly responsible for the lack of cooperation and recognition given to the affected parties.

7) Have any of you taken the time to study the process by which the State of New Mexico negotiated and implemented their

version of a "C&C agreement" with DOE for the waste disposal activities taking place at the Waste Isolation Pilot Project near Carlsbad, New Mexico? Have any of you visited the WIPP facility, or talked with the State government and environmental representatives in New Mexico to learn from their experiences?

Response

Yes. It is interesting to note that the New Mexico C and C Agreement was negotiated and signed as a result of a lawsuit filed by the State to force DOE to provide for State oversight of and input in DOE activities at the WIPP site. We reviewed the New Mexico C and C Agreement and met with New Mexico officials prior to preparing our own C and C working paper in 1985. The New Mexico officials we spoke with complained about the DOE mindset we have encountered in our C and C negotiations. That mindset does not and has not adapted itself to the independent oversight authority of affected parties. The CTUIR is attempting to use the C and C negotiations to clarify and define the Tribe's interests, concerns and authority in the repository program. While we feel we have learned some valuable lessons from the New Mexico experience, DOE's reluctance to recognize the role Congress intended affected Indian tribes to play leaves many obstacles to clear in any future negotiations.

8) Most of you have read GAO's draft report on "Institutional

Relations." This report was done at the request of this Committee, and should be available in final form by the end of this week.

a) What is your opinion about the conclusions and recommendations in this report?

b) If the recommendations in this report were implemented, would this significantly improve the prospects for success of the Program?

Response

The recommendations in GAO's report are generally good, but they will not, by themselves, solve the problems in the repository program. The specific recommendations and the CTUIR reaction are as follows:

a) DOE should open up all coordinating group meetings to affected parties. This has already been done by DOE - an effort we have been pushing for since 1985. The coordinating groups vary in their willingness to accommodate the input of affected parties. Our experience demonstrates the environmental and transportation coordinating groups have not been receptive to affective party participation while the institutional and socio-economic coordinating group has been.

b) DOE should use independent advisory groups. This suggestion raises many difficult questions. Who would the group be independent of? Who would select the group? Would their decisions be binding? On whom? What subject would the group provide advice on? To whom? What would be the implications of such groups on the independent oversight authority of the affected parties?

Despite these questions, it seems clear that the resolution of some important technical issues would benefit from the scrutiny of an independent advisory group comprised of members with the appropriate expertise. However, the affected parties must be involved in the selection of members and in defining their function.

c) DOE should adopt a revised strategy to formalize agreements with affected parties. DOE has no strategy for formalizing C and C agreements. The revised Mission Plan claims to contain new C and C initiatives but doesn't mention anything that could be characterized as an initiative. DOE's suggestion of generic C and C negotiations have been unequivocally rejected by all affected parties. The Act requires DOE to conduct negotiations with each affected party. DOE's acceptance of a "most favored nation" clause in a C and C agreement, whereby the first party to sign an agreement can receive the benefits of agreements signed subsequently by other affected parties, is not an initiative. It's a common clause in agreements of this nature. DOE's claim it is prepared to seek the services of third-party negotiators hardly seems much of an initiative, especially since that negotiator will have to argue DOE's positions.

d) DOE should revise definition of consultation and cooperation in Mission Plan. The present Mission Plan definition of consultation and cooperation requires DOE to do absolutely nothing. DOE called affected parties to a meeting at the last minute in New Orleans last November in the hopes we would resolve the three year old problem of consultation deficiencies in a day. DOE provided no proposal on a revised definition. DOE claimed they wanted to get the revised definition in the draft revised Mission Plan due out in a few months. We agreed resolution of this problem would take longer than DOE's Mission Plan schedule could accommodate. DOE claimed the initiative would continue. The revised Mission Plan says DOE wants to hold more meetings with affected parties before the Mission Plan revisions are submitted. As of March 18, 1987 we have not heard from DOE on when such a meeting might be scheduled. We think DOE's failure to follow up on the November meeting reflects their commitment to the consultation and cooperation requirements of the NWPA.

One final point. Generally, parties only enter negotiations and sign agreements with parties they trust. DOE's implementation of the repository program has not inspired the trust or confidence of the CTUIR. More to the point, the

CTUIR C and C negotiations experience with DOE has not earned the respect of Tribal negotiators. This lack of confidence in DOE will make returning to the negotiations table more difficult. DOE's clear violations of the letter and spirit of the NWPA has resulted in CTUIR skepticism DOE will comply with the provisions of a C and C agreement. DOE has failed to earn the confidence and trust of the CTUIR.

NEZ PERCE TRIBAL EXECUTIVE COMMITTEE
RESPONSES TO QUESTIONS
TO AFFECTED INDIAN TRIBES
UNITED STATES SENATE COMMITTEE
ON ENERGY AND NATURAL RESOURCES

1) By the very nature of our political process and our democratic structure, our society tends to depend more on the legal procedure, the hearing, the regulation, and the lawsuit, than it depends on the science, the technology, or the actual physical process of working through a problem. (Witness over 30 lawsuits now pending against DOE concerning the Nuclear Waste Program.) Is there anything that we, as Congress, or that the department, could bring to the nuclear waste disposal process, that would shift the focus away from the litigious, confrontational bind we now find ourselves in, and towards a more productive and constructive avenue?

As the Committee is aware, the Nez Perce Tribe is one of only two affected governments that has not sued DOE for its conduct of the NWPA program. Our reluctance to sue, however, does not indicate approval of the Department's implementation of the Act. To the contrary, we view the current posture and status of the program as illegal and scientifically unsound. The program is in its poor state because DOE has allowed political considerations to take precedence over scientific considerations. Our choice not to sue DOE in connection with the secretarial decisions of May 28, 1986, was based primarily on our belief that scarce tribal resources may be applied more constructively than in pursuit of litigation duplicative of that brought by the State of Washington and the Yakima Indian Nation.

We agree with the proposition that the democratic processes by which the United States is governed often results in legal procedures can be a burden to the process of developing scientific and technical solutions to problems involving public health and welfare. Those procedures, however, serve the useful function of assuring the integrity of scientific and technical work.

Litigation, therefore, always was likely to affect the NWPA program. Such litigation, however, should not always be regarded as unnecessary or inappropriate. The unlawful postponement of the second repository siting process and the specious application of the decision-making methodology in the first repository siting process provide fertile ground for litigation. What is unfortunate is that much of the litigation could have been avoided had DOE simply followed the law. Tribal and state complaints regarding the process would find less sympathy among federal judges and members of Congress if DOE had not ignored the NWPA's clear instruction to conduct both siting processes concurrently.

In order to restore the program to a sound footing, DOE must take the following actions immediately. First, all site-specific work must stop. Second, the May 28 decisions must be withdrawn for reconsideration. Third, DOE must establish a forum at which all affected parties could gather to develop a consensus on how the program should proceed. Fourth, DOE must prepare a plan of action proposing a reasonable schedule for carrying out both the first and second repository siting processes based on the consensus developed with the affected parties. Even if no such consensus emerges, DOE must revisit all key decisions from the point of the issuance of the siting guidelines for the first repository, giving due weight to tribal and state concerns regarding those decisions.

While some of this review will be duplicative, a vast amount of technical work will not need to be repeated. Thus, this review need not be wasteful. Indeed, it may prove less expensive than will the defense and, ultimately, the loss of many of the lawsuits now pending.

Congress should encourage such a process of review and reconciliation, if not by reopening the Act, then through the appropriations process. As is discussed below, we have seen an improvement in the Department's conduct since Congress' expressions of displeasure last fall, and urge Congress to continue to limit DOE's activities until such time as the Department restores the program to a posture consistent with the letter and spirit of the Act.

2) It is my understanding that C & C (Consultation and Cooperation) negotiations are now totally deadlocked. Could you provide the Committee with evidence that you have made good-faith efforts to sit down with the Department to hammer out a C & C Agreement? How would you characterize these efforts to date? What would it take to bring you back to the table at this point?

The Tribe commenced its formal preparation for C & C negotiations by holding training sessions on June 6 & 7 and July 25 & 26, 1986 for members of the Nez Perce Tribal Executive Committee ("NPTEC"). At those sessions, the NPTEC discussed the entire range of issues concerning the negotiation of a C & C Agreement with the Department. Immediately after the July training session, the Chairman of the NPTEC received a letter dated July 25, 1986, from Mr. Lee Olson, Director of the Basalt Waste Isolation Division of the Richland DOE Operations Office. (See Attachment No. 1.) This letter presumably was intended to satisfy the Secretary's obligation under Section 117(c) to seek to enter into negotiations within sixty days of the approval of a site for characterization.

The July 25 letter, however, proposed a procedure unacceptable to the Tribe. Specifically, the letter proposed a joint meeting of DOE, the three affected tribes, and the three affected states. Because the Tribe believes that one-to-one meetings between DOE and the Tribe are the only appropriate forum for the discussion of the terms of a C & C Agreement, that proposal was rejected.

As a result of the July training session, however, the Tribe invited DOE representatives to the tribal offices for a discussion of certain issues preliminary to the commencement of C & C negotiations. Messrs. Powell and Olson of the Richland Operations Office represented DOE at the meeting, which was held on August 1, 1986. The meeting proved to be a positive development. DOE made several commitments that resolved certain tribal concerns.

After the August 1 meeting, the commencement of negotiations was delayed when the Tribe learned that DOE had determined preliminarily that the Tribe was not eligible for impact assistance under Section 118(b)(3) of the NWPA. This determination never was formalized but was enforced by DOE contract officers in negotiations concerning the Tribe's grant for Fiscal Year 1987.

Despite several meetings and numerous discussions over the next two months, DOE never committed a final decision to writing. The Tribe, therefore, insisted on a process for final resolution of the issue that would guarantee consultation with the Tribe at key points in the decision-making process. The Tribal demand was communicated to DOE by letter dated October 17, 1986. (See Attachment No. 2.)

To its credit, DOE agreed to the Tribe's demand. While the issue was being pursued, C & C negotiations were pushed to the bottom of the Tribe's list of priorities for some time. Only in December did the Tribe resume its consideration of C & C negotiations, and the impact assistance issue soon merged with the matter of C & C negotiations.

The Tribe had received a letter from Ben Rusche renewing the Department's invitation to negotiate, this time on the one-to-one basis the Tribe desired. (See Attachment No. 3.) Partially in response to this letter, NPTEC Chairman J. Herman Reuben wrote to Mr. Rusche and linked the outcome of the impact assistance issue to the Tribe's willingness to enter into C & C negotiations. (See Attachment No. 4.)

When the NPTEC met again to consider C & C issues on December 12 & 13, the outcome of the session was a conditional offer to negotiate a C & C Agreement. This offer was made in a letter from Chairman Reuben to Secretary Herrington conveying two Resolutions of the NPTEC. (See Attachment No. 5.) The offer was conditioned on a favorable resolution of the impact assistance issue. In addition, the Tribe asked the Secretary to acknowledge certain Tribal rights and interests.

While tribal preparation for negotiations continued, DOE moved toward a resolution of the impact assistance issue. Finally, on January 22, 1987, Chairman Reuben was advised by John Anttonen of the

Richland Operations Office that the issue had been resolved in the Tribe's favor. On January 30, 1987, the Tribe received written confirmation of the Department's decision. (See Attachment No. 6.)

The Tribe was pleased with the disposition of the impact assistance issue. We do have lingering concerns regarding the decision-making process, but believe the the entire affair constitutes the showing of good faith on DOE's part that we deemed a prerequisite to C & C negotiations.

That satisfaction, however, was tempered by the emergence of yet another issue concerning tribal rights of participation under the Act. Specifically, DOE announced at a December meeting of the Institutional Socioeconomic Coordinating Group that it was reviewing the question of whether C & C Agreements with affected tribes could include all of the eleven elements listed in Section 117(c). That the Department should entertain doubts on this issue at that late date was made doubly unfortunate by the fact that DOE personnel from both Richland and headquarters had assured the Tribe that each of the eleven items was appropriate to be included in C & C Agreements with affected tribes.

Significantly, tribal eligibility under each of the eleven areas was one of the principles Chairman Reuben asked Secretary Herrington to acknowledge in the Chairman's letter of December 15. By letter dated January 14, 1987, Chairman Reuben advised Mr. Rusche that this issue would have to be resolved before C & C negotiations could begin. (See Attachment No. 7.)

In Chairman Reuben's letter of December 15, he had requested the Secretary's acknowledgment of five principles. Those principles are as follows:

1. The Tribe has a critical interest in maintaining the environmental integrity of the Columbia River and its tributaries, and Departmental activities at Hanford should be designed to avoid adverse impacts on the River.
2. The Tribe has a critical interest in protecting the natural resources in the Tribe's possessory and usage rights area, and Departmental activities at Hanford should be designed to avoid adverse impacts on those resources.
3. By virtue of its treaties with the United States, the Tribe has prior and paramount reserved rights to certain natural resources, and the Department is obliged to take all reasonable measures to avoid harm to those resource.
4. As acknowledged in the President's policy statement of January 1983, a government-to-government relationship exists between the United States and the Tribe, which obligates the United States to protect and enhance the proprietary and governmental rights of the Tribe.
5. The provisions of Section 117(c) do not constitute a limitation on the contents of a C & C Agreement; all issues arising from the NWPA program are open for discussion in C & C negotiations.

The Department's response came in a letter dated February 13 from Ben Rusche to Chairman Reuben. (See Attachment No. 8.) In that letter, Mr. Rusche agreed to the Tribe's position on the Section 117(c) issue and the Tribe's requests on certain procedural matters concerning C & C negotiations. Mr. Rusche's letter did not address, however, all of the principles of which the Tribe requested acknowledgement.

The upshot of this history is that the Tribe has exhibited good faith throughout the process. We are pleased that DOE has begun to show interest in a better relationship with the Tribe. In a sense, we

If we were confident that DOE decision-making was driven by technology and science rather than political considerations, we would be more sanguine concerning the prospect of the characterization process showing Hanford to be an inappropriate choice. DOE's credibility as an objective analyst of scientific data, however, has been compromised, in our view. It is a matter of record that:

(1) NRC staff have criticized DOE's technical studies as being non-conservative, i.e., overly optimistic;

(2) Hanford rated last among the five sites nominated for characterization in both pre-closure and post-closure factors, yet was selected for characterization;

(3) DOE systematically removed negative observations regarding the Hanford Site from drafts of the Multiattribute Utility Analysis that served as the basis for choosing sites for characterization;

(4) Experts in decision analysis who participated in DOE's preparation of the MUA and in the review of that methodology conducted by the National Academy of Sciences have criticized atrongly the decision to characterize Hanford.

Given this record, we are concerned that DOE's technical work maybe of doubtful reliability and that the ultimate criteria for decision-making may be political rather than scientific. Under these circumstances, we cannot see what is to be gained from characterization.

4) Besides the influx of jobs and money directly associated with site characterization, what other socio-economic benefits would you consider as essential to your tribe's full cooperation in the site selection process?

A primary concern of the Nez Perce Tribe is the development of sufficient technical expertise to participate fully in the process. The Tribe has retained technical experts to assist us in our evaluation of the characterization activities at Hanford. We have a continuing need, however, to develop a force of trained personnel to assist in our monitoring, testing and evaluation activities. To this end, we would find it most helpful to have funds to train Tribal members to operate monitoring and testing equipment, analyze data, and review DOE's technical work.

5) In your opinion, would earlier, greater involvement by NRC and EPA help restore your confidence in DOE's program?

As a general matter, we believe that both NRC and EPA have been involved in the program to the appropriate extent. A striking exception involves NRC's failure to enforce its agreement with DOE on the timing of the preliminary determination of suitability. As the Committee knows, DOE committed in an NRC meeting to make that determination only after characterization was well under way. The Department later reversed itself, and NRC's failure to insist that the prior agreement be followed was disappointing at best.

Our confidence in the program might be increased by greater EPA and NRC involvement, but only if those agencies have the authority to force DOE to comply with their suggestions. NRC staff have commented constructively on DOE's work, yet DOE persists in ignoring many of those comments. For example, the NRC staff made a number of detailed

We attribute the Department's improved performance primarily to the Continuing Resolution provision withholding $79 million of DOE's budget until such time as the Secretary certifies DOE's good faith in implementing Section 117 of the Act. Another factor appears to be Mr. Kale's ascension in the Office of Geologic Repositories. Finally, Mr. Rusche has taken a personal interest in DOE's relations with the affected tribes and that interest has worked very much to our benefit.

We believe that the Office of Civilian Radioactive Waste Management has worked hard to develop a better relationship with the Tribe over the past few months. OCRWM has shown good faith in its dealings with the Tribe, but only within the confines of the atmosphere created by the May 28 decisions. If we accepted those decisions as being valid, we would support a finding of the Department's good faith in its dealings with us. Because we regard the May 28 decisions as illegal, we cannot earnestly support such a finding. We of course offer no opinion as to DOE's good faith in dealing with other affected parties.

We believe that Congress' action to force better efforts from the Department in the area of C & c has had the effect of improving our relationship with DOE. That being so and given the likelihood of protracted negotiations between DOE and the Tribe, we believe that Congress must continue to press DOE in this area if the relationship is to become what Congress envisioned when enacting the NWPA.

7) Have any of you taken the time to study the process by which the State of New Mexico negotiated and implemented their version of a "C & C agreement" with DOE for the waste disposal activities taking place at the Waste Isolation Pilot Project near Carlsbad,

GAO's mission was defined quite narrowly. Rather than drawing conclusions on the Department's conduct of institutional relations, the report merely restates the views of the Department and the affected parties, and offers little in the way of a substantive comment. This approach, unfortunately, provides only a catalog of problems and not an analysis of the cause of the problems.

Nevertheless, the recommendations, if implemented, will have a positive effect on DOE/state/tribal relations. A good first step is the opening of coordinating group meetings to state and tribal participation as recommended in the draft report. The real question, however, is how to involve states and tribes at the key points in DOE's decision-making process, and it is not yet clear that participation in the coordinating groups is sufficient to realize that goal.

Another recommendation was that DOE better define consultation and cooperation in the Mission Plan. We cannot know how useful such a definition would be without knowing its content. The draft Mission Plan amendments, unfortunately, offer no clue as to how the Department would define C & C. While the states and tribes will offer suggestions, we frankly have little confidence that an acceptable definition will emerge from this process.

The recommendations, in the final analysis, treat symptoms of the problem but do not cure the disease. The disease is an institutional arrogance that pervades in many quarters of the Department. That arrogance reached its zenith with the May 28 decisions when the Secretary simply overruled the explicit direction of Congress as to how the program would be conducted. We do not downplay the difficulty of meeting the Department's responsibilities in involving tribes and states in the program. No doubt these responsibilities are particularly difficult for an agency accustomed to operating in secrecy and with disregard for the prerogatives of tribal, state and local governments. Congress, however, made the judgment in passing the Act that the public must be involved if the program is to succeed. This judgment has proved prescient, and DOE's failure to heed the views of the governments most involved in the process is largely responsible for the poor state of the program.

There are indications that this attitude is changing. Recent events suggest that the Department finally is heeding the good counsel of those within DOE who advocate greater accomodation of state and tribal concerns. The admonitions the program has received from Congress clearly has had an effect. This change in attitude, however, should not have required the damage that has been done to the program.

A final observation concerns the unfortunate tendency for DOE headquarters to reverse, modify or limit commitments made by the project offices to the tribes and states. While the Tribe's relationship with the Richland Operations Office is not ideal, it is demonstrably better than our relationship with headquarters. We have a greater ability to influence BWIP policies than headquarters policies, but all too often have seen agreements with BWIP upset by orders from above. Our confidence in the reliability of BWIP decisions therefore is affected. This creates an unnecessary tension in our relationship with the DOE personnel with whom we work most closely.

We appreciate this opportunity to expand on the views expressed at the February 4 hearing, and would be happy to respond to any other questions the Committee cares to pose.

Respectfully submitted,

J. Herman Reuben, Chairman

Elliot Moffet, Secretary

Del T. White, Chairman
Nuclear Waste Subcommittee

ATTACHMENT No. 1 012801

FROM 4963 '86.07.25 08:59

Department of Energy
Richland Operations Office
P.O. Box 550
Richland, Washington 99352

86-BWI-18

JUL 25 1986

Mr. J. Herman Reuben, Chairman
Nez Perce Tribal Executive Committee
P. O. Box 305
Lapwai, ID 83540

Dear Mr. Reuben:

CONSULTATION AND COOPERATION AGREEMENT

On May 28, 1986, the Department of Energy's recommendation of three sites in Nevada, Texas, and Washington was approved for detailed site characterization for a deep-mined geologic repository for high-level waste and spent nuclear fuel.

In accordance with Section 117(c) of the Nuclear Waste Policy Act of 1982, the Department desires to begin the process that would eventually lead to a signed Consultation and Cooperation (C&C) Agreement.

As a starting point, the Department would like to meet with representatives from the States and three affected Indian Tribes to discuss C&C activities to date, review the scope and parameters of C&C agreements, and talk about provisions that might be in common in all such agreements.

We will be contacting you in the near future to arrange for a time and place that would be acceptable to each of the States and Indian Tribes. Should you desire to discuss this matter with me, please do not hesitate to give me a call.

Sincerely,

O. L. Olson

O. L. Olson, Director
Basalt Waste Isolation Division

BWI:OLO

ATTACHMENT No. 2

Nez Perce
TRIBAL EXECUTIVE COMMITTEE
P.O. Box 305
LAPWAI, IDAHO
83540
(208) 843-2253

October 17, 1986

Mr. John Antonnen, Assistant Manager
Richland Operation Office
P.O. Box 550
Richland, WA 99352

Dear Mr. Antonnen:

For the past several months, DOE has had under consideration certain questions concerning the right of the affected tribes to conduct impact studies, to prepare and submit an impact report and - should a tribe choose to do so - to prepare and submit a request for impact assistance under Section 118 of the NWPA. These matters initially were raised during discussion between representatives of DOE and the Umatilla program concerning a consultation and cooperation agreement. More recently, the issues have been discussed at length in the context of FY '87 grant applications filed by Nez Perce and Umatilla.

The Nez Perce Tribe has two basic concerns regarding the issues. Let me first emphasize, however, that these issues go to the very heart of tribal rights of participation in the NWPA process. We are deeply concerned with what we have come to regard as an affort by DOE to deny the tribes the ability to participate meaningfully in the BWIP project.

Our concerns fall into two categories. The first involves the substantive issues themselves. The indications we have gotten from BWIP personnel is that these issues of statutory interpretation have been resolved against us. After careful study of the substantive issues, we feel very strongly that DOE is incorrect as a matter of law and certainly as a matter of policy.

Our second concern is intimately related to the first and goes to the process through which this decision has been reached. While DOE personnel have advised us of their conclusions and imposed those conclusions on the Tribe in grant negotiations, we do not yet have any formal decision document explaining the Department's reasoning. In fact, we have not formally received the decision itself. Moreover, the Department did not solicit our views on the matter before making its determination. Thus, we are left in the position of responding to a Departmental decision made without our imput, without any explanation and without any formal communication of the decision.

As stated above, these issues are of critical importance to the Tribe's role in the program. The current situation is unacceptable. We therefore make the following requests and insist on a response within five working days:

1. We request that the BWIP office advise us formally and in writing of its preliminary decision on these issues and the reasoning supporting the decision on or before October 21, 1986.

2. We request that, if the Tribe so desires, representatives of the Tribe and the BWIP personnel involved in the decision meet in formal session on or before November 7, 1986, to discuss our respective positions on the issues.

3. We request a final decision on the issues by BWIP, communicated formally and writing, and including specific responses to any comments the tribe presents to the Department, on or before November 21, 1986.

4. If the decision is adverse to the Tribe, we request that you refer the matter to

appropriate personnel at DOE Headquarters for a final Departmental decision. We will prepare and submit a statement of our position to be included in your transmittal to DOE Headquarters. The transmittal is to be made on or before December 5, 1986.

5. We request that you advise Headquarters that personnel who will be involved in the decision should meet with representatives of the Tribe before making a final decision. This meeting should be held on or before December 19, 1986, and a final decision made by Headquarters on or before December 31, 1986. The final decision, of course, should be communicated formally and in writing, and should include both a complete statement of the reasoning supporting the decision and specific Departmental responses to comments and arguments made by the Tribe.

We believe that these requests are consistent with BWIP's current intentions. We find it necessary to make these requests formally, however, due to BWIP's seeming reluctance to take a formal position, explain its position and do so in a timely manner. The gravity and urgency of these issues are too great for us to tolerate any longer delayed and informal responses to Tribal concerns.

I would be happy to discuss the details of these requests either in person or by telephone. I will insist, however, that any agreements we make be confirmed in writing. Your prompt consideration of this matter will be appreciated.

Sincerely,

J. Herman Reuben

J. Herman Reuben, Chairman
Nez Perce Tribal Executive Committee

cc: R.T. Halfmoon, Manager, NP-NWPA
D.T. White, NW Subcommittee
LB.Kevin Gover, Attorney
Max Powell, Richland Operations

ATTACHMENT No. 3

Department of Energy
Washington, DC 20585

NOV 19 1986

Mr. J. Herman Reuben, Chairman
Nez Perce Tribal
  Executive Committee
P.O. Box 305
Lapwai, Idaho 83540

Dear Mr. Reuben:

On May 28, 1986, President Reagan approved the Department of Energy's (DOE) recommendation of three sites in Nevada, Texas, and Washington for detailed site characterization for a deep-mined geologic repository for high-level radioactive waste and spent nuclear fuel.

In accordance with Section 117(c) of the Nuclear Waste Policy Act of 1982 (the Act), not later than 60 days following such approval the Department was required to seek to enter into negotiations leading toward consummation of a written binding consultation and cooperation agreement. The provisions of such an agreement are defined by the Act.

On July 25, 1986, Mr. Lee Olson, director of the Basalt Waste Isolation Division at DOE's Richland Operations Office, wrote to you recommending that we initiate the process of developing consultation and cooperation agreements with a meeting of representatives of all States, within which recommended sites are located, and of all three affected Indian Tribes. Similar letters were sent by our project offices to the three affected States and to the other two affected Indian Tribes.

We learned from the States and Indian Tribes that negotiations between the Department and the individual State and Tribal nuclear waste offices might prove more fruitful than a general meeting. Therefore, I am renewing the offer to initiate negotiations for a consultation and cooperation agreement, this time between DOE and the Nez Perce Indian Tribe.

To facilitate the commencement of negotiations, the Office of Civilian Radioactive Waste Management has designated a team to negotiate with the Nez Perce Indian Tribe. This team will be led by Mr. John Anttonen, an assistant manager at the Richland Operations Office. Mr. Anttonen will be contacting your office shortly to discuss appropriate arrangements.

We look forward to the participation of the Nez Perce Indian Tribe in this important statutory process.

Sincerely,

Ben C. Rusche

Ben C. Rusche, Director
Office of Civilian Radioactive
Waste Mangement

ATTACHMENT No. 4

December 10, 1986

Mr. Ben C. Rusche
100 Independence Avenue, Southwest
Forrestal Building
RW-40
Washington, DC 20585

Dear Mr. Rusche:

I am writing to raise with you a matter of serious concern to the Nez Perce Tribe. Specifically, I would like to share with you my thoughts concerning the issue of the Tribe's eligibility for impact assistance under Section 118 (b) of the Nuclear Waste Policy Act and, more generally, the state of the relationship between the Tribe and the Department of Energy, with particular emphasis on the consultation and cooperation process anticipated by the NWPA.

The Tribe currently is in discussions with personnel from DOE-Richland concerning our claimed right under the NWPA to conduct impact studies, prepare and submit an impact report and assistance request, and receive impact assistance. I understand that our attorney has written to you directly concerning this matter, and that you are aware of the disucssions we are having with Richland. According to our program staff, some uncertainty exists as to whether Richland's decision will be made without direction from headquarters. We had hoped initially to establish a step-by-step process of first eliciting an independent decision on the issue from Richland and then, if that decision is not satisfactory, appealing that decision to headquarters where a second, de novo, review would occur.

I now am advised by my staff that headquarters apparently will be involved in the decision we are to receive from Richland. Were we sure that the Richland decision was going to be made independent of headquarters, I would defer this letter to a later date. Because it appears that headquarters will determine the Richland decision, and because of the imminence of the Richland decision, I am writing now. I want to make clear to you our concerns and the importance that we attach to this issue. I believe it is imperative that you and I, as policy-makers, communicate directly on this issue, without the contentiousness that inheres when we call upon our respective legal staffs.

In fact, my first observation concerning the issue is that it is unfortunate that the lawyers have become involved in what is first and foremost a policy issue. I have read our attorney's analysis of this issue, and find it to be persuasive. I am quite certain, however, that if so inclined, your attorneys could produce an analysis equally persuasive to you yielding the opposite conclusion. This leads me to believe that, as a matter of law, the issue of the Tribe's eligibility for impact assistance reasonably could be decided either way. If that is so, then the guiding considerations in the Department's decision should be policy considerations. And the key policy principle, my view, is that the participation of affected tribes should be the broadest possible.

We are disappointed and frustrated with the Department's conduct of the consultation and cooperation requirements of the Act in regard to tribal participation. In my view, every time a debatable issue concerning the breadth of tribal participation arises, it is resolved against the Tribe. An institutional bias against broad tribal participation is evident in many program documents, not the least of which is the draft internal guidelines for C & C Agreements. When Departmental policies pledge broad participatory rights, such pledges ring hollow in light of the actions of the Department. Your pledges of consultation and cooperation at some point must be backed by substantive actions evidencing real commitment to the concept.

As you know, the Nez Perce Tribe to date has eschewed litigation to resolve our grievances against the Department. We also have been reluctant to commence a major legislative effort that would inhibit the Department's execution of the NWPA. I sincerely hope that our reluctance to pursue these avenues is not interpreted as satisfaction with the conduct of the program. In fact, we are deeply disappointed with a pattern of Departmental decisions obvisously intended to limit tribal participation to the bare minimum. While our attorneys play an important role in our program, we are unwilling to have them play the dominant role so long as a real possibility exists that policy issues can be resolved by discussions between policy-makers.

It is for this reason that we are considering carefully the initiation of negotiations with the Department on the terms of a C & C Agreement. We have been preparing for such an initiative for well over a year, and are on the verge of a final decision as to whether to proceed. Quite frankly, the resolution of the impact assistance issue will weigh heavily in that decision. If the Department is unwilling to agree to the Tribe's position on a matter so central to our rights of meaningful participation, the prospects for negotiating an agreement guaranteeing a satisfactory level of tribal participation are quite remote. If the prospects for success in negotiations is remote, it will be very difficult to justify to our constituents a decision to proceed with such negotiations.

I believe that the Tribe's relationship with the Department is at a crossroads. Our program has matured and our expectations for Departmental efforts to consult and cooperate are very high. It is a fortuitous time for a key issue to arise, as the resolution of that issue will tell us much about how our relationship should proceed in the future. I urge you to seek a decision that will give us cause to believe that our existing policy of cooperation not confrontation is in the best interest of the Tribe. I urge you further to please respond to this issue by early January or within the next thirty days.

Sincerely yours,

J. Herman Reuben, Chairman
NPTEC

JHR:ceg

cc: Elliott Moffett, NPTEC Secretary
B. Kevin Gover, Tribal Attorney
Ronald T. Halfmoon, Manager, NP-NWPA

1. The Tribe has a critical interest in maintaining the environmental integrity of the Columbia River and its tributaries, and Departmental activities at Hanford should be designed to avoid adverse impacts on the River.

2. The Tribe has critical interest in protecting the natural resources in the Tribe's possessory and usage rights area, and Departmental activities at Hanford should be designed to avoid adverse impacts on those resources.

3. By virtue of its treaties with the United States, the Tribe has prior and paramount reserved rights to certain natural resources, and the Department is obliged to take all reasonable measures to avoid harm to those resources.

4. As acknowledged in the President's policy statement of January, 1983; a government-to-government relationship exists between the United States and the Tribe under which the United States is obliged to protect and enhance the proprietary and governmental rights of the Tribe.

5. The provisions of Section 117 (c) do not constitute a limitation on the contents of a C&C Agreement; all issues arising from the NWPA program are open for discussion in C&C negotiations.

Finally, we wish to advise you that before we will engage in discussions on the contents of an agreement, rules for the conduct of negotiations must be agreed upon. We will insist that transcripts of negotiations be made. Furthermore, we will insist upon procedures for the prompt ratification of agreements reached in discussions between Tribal and Department negotiations by the Nez Perce Tribal Executive Committee and DOE headquarters, respectively. We believe such procedures are necessary to facilitate the efficient disposition of issues during negotiations.

In taking this step, we are mindful that many problems exist in our relationship with the Department. There are, however, concerns common to us. We both, for example, seek to ensure the health and safety of the public during the Department's activities at the Hanford Reservation. We are hopeful that C&C negotiations will result in a mutually beneficial arrangement for the advancement of both of our interests.

Sincerely,

Herman Reuben

J. Herman Reuben, Chairman
NPTEC

Elliott L Moffett

Elliott L. Moffett, Secretary
NPTEC

JHR:ceg

cc: Ben Rusche
Stephen Kale
John Antonnen
B. Kevin Gover
Dan Hester

NP 87-75

RESOLUTION

HEREAS, the Nez Perce Tribal Executive Committee has been empowered to act for and in behalf of the Nez Perce Tribe, pursuant to the Revised Constitution and By-Laws, adopted by the General Council of the Nez Perce Tribe on May 6, 1961 and approved by the Acting Commissioner of Indian Affairs on June 27, 1961; and

HEREAS, the Nuclear Waste Policy Act of 1982 ("NWPA") established a procedure by which two sites for the permanent geologic disposal of high-level civilian and defense radioactive waste would be identified, investigated, developed, constructed and operated; and

HEREAS, the Department of Energy (DOE) was assigned primary responsibility for carrying out the provisions of the NWPA; and

HEREAS, the NWPA requires broad public participation in the process of developing a repository, including formal participation by Indian tribal governments whose interests might substantially and adversely be affected by the investigation, development, construction or operation of a repository at any given site; and

HEREAS, the Hanford Reservation in Washington is one of three sites being characterized to determine its suitability as a repository for the permanent disposal of high-level radioactive waste; and

HEREAS, the characterization, development, construction and operation of a repository at the Hanford Reservation substantially and adversely may affect rights guaranteed by treaty to the Nez Perce Tribe, the health and safety of tribal constituents, the social and economic well-being of the Tribe and its constituents, and the quality of the environment in tribal interest areas; and

HEREAS, the Nez Perce Tribe therefore has been designated an affected tribe under the NWPA; and

HEREAS, the tribe currently is engaged in discussions with the Department of Energy to resolve the issue of whether the Tribe may conduct impact studies, prepare and submit to Congress an impact report and request for impact assistance, and to receive assistance designed including, without limitation, the Secretary of Energy, the Director of the Office of Civilian Radioactive Waste Management, the Director of the Office of Geologic Repositories and the Director of the Basalt Waste Isolation Project.

CERTIFICATION

The foregoing resolution was duly adopted by the NPTEC Meeting in Special Session, December 15, 1986, in the Richard A. Halfmoon Council Chambers, Lapwai, Idaho, a quorum of its Members being present and voting.

BY: Elliott L. Moffett
ELLIOTT H. MOFFETT, SECRETARY

ATTEST:

Herman Reuben
HERMAN REUBEN, CHAIRMAN

RESOLUTION

WHEREAS, the Nez Perce Tribal Executive Committee has been empowered to act for and in behalf of the Nez Perce Tribe, pursuant to the Revised Constitution and By-Laws, adopted by the General Council of the Nez Perce Tribe on May 6, 1961 and approved by the Acting Commissioner of Indian Affairs on June 27, 1961; and

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WHEREAS, the Department of Energy (DOE) was assigned primary responsibility for carrying out the provisions of the NWPA; and

WHEREAS, the NWPA requires broad public participation in the process of developing a repository, including formal participation by Indian tribal governments whose interests might substantially and adversely be affected by the investigation, development, construction or operation of a repository at any given site; and

WHEREAS, the Hanford Reservation in Washington is one of three sites being characterized to determine its suitability as a repository for the permanent disposal of high-level radioactive waste; and

WHEREAS, the characterization, development, construction and operation of a repository at the Hanford Reservation substantially and adversely may affect rights guaranteed by treaty to the Nez Perce Tribe, the health and safety of tribal constituents, the social and economic well-being of the Tribe and its constituents, and the quality of the environment in tribal interest areas; and

WHEREAS, the Nez Perce Tribe therefore has been designated an affected tribe under the NWPA; and

WHEREAS, the NWPA authorizes the negotiation and execution of binding and enforceable agreements between affected tribes and DOE, such agreements being intended to govern the process of consultation and cooperation (C & C) between the tribes and DOE; and nomination, recommendation or approval of the Hanford Site for characterization; the issuance of environmental assessments for the Hanford, Yucca Mountain and Deaf Smith County Sites; the preliminary determination of Hanford's suitability for development as a repository; and the decision to postpose indefinitely site-specific work on the siting of a second repository; and nothing in this resolution shall be interpreted to waive, abrograte, limit, diminish or modify any right claimed by the Tribe, including rights of action, rights of access to the courts and United States Government for the redress of grievances.

CERTIFICATION

The foregoing resolution was duly adopted by the NPTEC Meeting in Special Session, December 15, 1986, in the Richard A. Halfmoon Council Chambers, Lapwai, Idaho, a quorum of its Members being present and voting.

BY: Elliott W Moffett
ELLIOTT W. MOFFETT, SECRETARY

ATTEST:
J. Herman Reuben
J. HERMAN REUBEN, CHAIRMAN

Department of Energy
Richland Operations Office
P.O. Box 550
Richland, Washington 99352

87-AMC-7

January 29, 1987

Mr. J. Herman Reuben, Chairman
Nez Perce Tribal Executive Committee
P. O. Box 305
Lapwai, ID 83540

Dear Mr. Reuben:

IMPACT ASSISTANCE

The Department of Energy (DOE) has determined that "affected Indian Tribes," as defined by the Nuclear Waste Policy Act of 1982 (the Act) Section 2(2)(B), are eligible to receive financial assistance to develop a report requesting impact assistance under Section 118(b)(2)(A)(ii) of the Act. Furthermore, if the Hanford Site is finally selected as a site for construction of a repository, then the Department of the Interior designated affected Indian Tribes for the Hanford Site would be eligible for financial and technical impact assistance (to address impacts of repository development) under Section 118(b)(3)(A) and (B) of the Act.

Affected Indian Tribes are eligible to receive financial assistance during site characterization for the purpose of preparing an impact assistance report; however, as with all affected parties, financial impact assistance payments would not commence until after the initiation of construction activities at such site, in accordance with the Act. The Department realizes that affected parties are also concerned about potential adverse impacts stemming from DOE's site characterization activities. During site characterization, DOE will be conducting its activities in a manner that minimizes, to the maximum extent practicable, any significant adverse environmental impacts in accordance with Section 113(a) of the Act. Although DOE does not anticipate any significant adverse impacts as a result of site characterization activities, should adverse impacts occur during site characterization, DOE would propose to address such impacts, in consultation with affected parties, via direct technical assistance.

As DOE carries out the Congressional mandate to develop a nuclear waste repository, the Department intends to ensure that the Nez Perce Tribal interests are protected. I realize that you have written letters to both Secretary Herrington and Mr. Ben Rusche, Director of the Office of Civilian Radioactive Waste Management, in which you expressed additional concerns about DOE and Nez Perce relations. Mr. Rusche will be responding to those concerns in a separate letter to you.

If you have questions about either this letter specifically or other issues, please call me or Mr. Max Powell of my staff at (509) 376-5267. I look forward to future discussions with you about our program.

Sincerely,

John H. Anttonen, Assistant Manager
for Commercial Nuclear Waste

My second basis for concern goes to the process by which the Department intends to resolve the issue. The Tribe has objected frequently to the Department's practice of making important decisions concerning Tribal rights of participation behind closed doors and without consulting the Tribe. We raised this concern most recently in the context of the Department's consideration of the question of whether the Tribe is eligible for impact assistance under Section 118(b). I am most disappointed to find myself again having to raise with the Department its obligation to consult so soon after the last reminder.

We must insist that this question be resolved in consultation with the Tribe. As you know, we recently advised Secretary Herrington of our willingness to begin C & C negotiations under certain conditions. One of those conditions is an acknowledgement by the Secretary that Section 117(c) is not an all-inclusive listing of the provisions that may be contained in a C & C Agreement. Now we learn that the Department has doubts that the Agreement can include even all the items listed.

I view this as a profoundly negative development. Each such occurrence lessens my faith in the Department's commitment to the principle of broad tribal participation embodied in the Act. An unfavorable resolution of the Section 117(c) issue makes it virtually impossible for the Nez Perce Tribal Executive Committee to justify to its constituents the commencement of C & C negotiations.

I suggest that representatives of the Tribe and the Department, perhaps including you and I, should meet to discuss this critical issue. I hope that you can respond quickly to this request. We are in the process of preparing our Section 117(c) report to Congress on the progress towards a C & C Agreement. I hope very much to be able to report

Mr. Ben C. Rusche, Director
Page Three
January 14, 1987

that the Tribe and the Department are making meaningful progress towards the commencement of negotiations. Your immediate response to this letter, therefore, would be most appreciated.

Sincerely,

Elliott L. Moffett

for J. Herman Reuben, Chairman
NPTEC

JHR:ceg

cc: The Honorable John Herrington
Barry Gale
Max Powell, DOE-RL
Lee Olson, DOE-RL
John Anttonen, DOE-RL
William Burke, CTUIR
B. Kevin Gover
Dan Hester
Ronald T. Halfmoon

Department of Energy
Washington, DC 20585

FEB 13 1987

Mr. J. Herman Reuben, Chairman
Nez Perce Tribal Executive Committee
P.O. Box 305
Lapwai, Idaho 83540

Dear Mr. Reuben:

Thank you for your December 10, 1986, letter concerning the issue of the Nez Perce Tribe's eligibility for impact assistance under Section 118(b) of the Nuclear Waste Policy Act of 1982 (the Act) and your January 14, 1987, letter concerning the inclusion of Indian Tribes in all eleven elements listed in Section 117(c) of the Act. The Department of Energy has also received your December 15, 1986, letter to Secretary Herrington requesting the initiation of negotiations on the provisions of a Consultation and Cooperation (C&C) Agreement between the Nez Perce Tribe and the Department of Energy. Secretary Herrington has asked me to respond to your letters.

As Mr. John Anttonen, Assistant Manager for Commercial Nuclear Waste at the Department's Richland Operations Office, informed you by letter dated January 29, 1987, the Department has determined that "affected Indian Tribes," as defined in Section 2(2)(B) of the Act, are eligible to receive financial assistance to develop a report requesting impact assistance under Section 118(b)(2)(A)(ii) of the Act. Furthermore, if the Hanford site is finally selected and receives Nuclear Regulatory Commission authorization for constructing a repository, then the Department of the Interior designated affected Indian Tribes for the Hanford site would be eligible for financial and technical impact assistance (to address impacts of repository development) under Section 118(b)(3)(A) and (B) of the Act.

Both Secretary Herrington and I recognize the importance of the consultation and cooperation requirements of the Act. The success of the waste-management program may depend largely on the success of institutional relations as well as interactions with the public. We intend to use the extended schedule described in the Draft Mission Plan Amendment to increase our efforts in consulting with the States and affected Indian Tribes. You have raised some very important issues in the principles and attached resolutions you have submitted, and we would like to carefully explore those issues with you through the consultation and cooperation mechanism provided by the Act.

Regarding the issue of whether the eleven items listed in Section 117(c) of the Act may be included in a C&C Agreement between the Department and affected Indian Tribes, I would like to offer the following clarification. The Department considers it appropriate to negotiate on any issues of concern to the Indian Tribes in arriving at a completed C&C Agreement.

The Department looks forward to entering into C&C negotiations with the Nez Perce Indian Tribe. The Department's Richland Operations Office will be contacting the Nez Perce Indian Tribe to arrange an initial meeting. Transcripts of negotiation discussions may be made, as has been done in other C&C negotiations in which DOE has participated. The Department shares the Nez Perce Indian Tribe's goal that we reach prompt resolution of issues and complete an agreement as soon as possible.

As the Department and the Nez Perce Indian Tribe work together on this important national program, I assure you that the Department is committed to enhanced programs leading to improved institutional relations and negotiated C&C Agreements.

Sincerely,

Ben C Rusche

Ben C. Rusche, Director
Office of Civilian Radioactive
Waste Management

APPENDIX III

Responses to Additional Committee Questions From the February 5, 1987 Hearing

POST-HEARING QUESTIONS AND ANSWERS
RELATING TO THE HEARING OF FEBRUARY 5, 1987

BEFORE THE

COMMITTEE ON ENERGY AND NATURAL RESOURCES
UNITED STATES SENATE

WITNESS: BEN C. RUSCHE, DIRECTOR
OFFICE OF CIVILIAN RADIOACTIVE WASTE MANAGEMENT
U.S. DEPARTMENT OF ENERGY

QUESTIONS FROM SENATOR WIRTH

QUESTION 1: In assessing and comparing the first-round sites' suitability for site characterization and development as repositories, did the Department conduct route-specific analyses to assess the costs and risks of transporting high level nuclear waste from reactor or temporary storage sites to a particular repository?

ANSWER: No, DOE did not conduct route specific analyses to assess the cost and risk of transporting either defense high level nuclear waste (DHLW) or spent fuel from DHLW generators and commercial reactors, respectively, to any potential candidate repository sites. However, actual routes generated by the routing codes HIGHWAY (truck transport) and INTERLINE (rail transport) at Oak Ridge National Laboratory were used to determine certain parameter values for the risk analyses. These parameters were the distance traveled per shipment and the fractions of travel in urban, suburban, and rural zones. Unit-risk factors generated by RADTRAN-III were combined with the actual route data for each origin-destination pair. The highway routes selected are consistent with DOT regulations. Another slightly different approach using "great circle distances", was used to generate distance parameters for WASTES II, a transportation logistics code developed at Pacific Northwest Laboratory which was used to carry out the cost analyses contained in the Environmental

Assessments. The two methods give values for total distance traveled that differ by less than 10%.

QUESTIONS FROM SENATOR WIRTH

QUESTION 2: If the answer to the preceding question is "no," did the Department in any other way identify and consider risks and costs specific to certain routes, states, or regions. For example, near the Vail Interchange on Interstate 70 west of Denver, the accident rate for large trucks is thirty-four times greater than the national average. Were factors such as this, which obviously affect the risk of accidents, considered by the Department in preparing the environmental assessments on the first-round repository sites?

ANSWER: No, but the effect of changes in accident-related parameter values, including accident rate, has been examined in a recent Sandia study for a sample problem involving the truck transport of spent fuel from the Crystal River reactor in Florida to the candidate repository site near Hanford, WA, a one-way distance of 4817km. Total route characteristics are examined. For example, the effect of doubling the accident rate over the entire route was found to increase the accident risk by a factor of about 1.9. Clearly, the occurrence of small segments of highway (such as the Vail interchange) with high accident rates would not raise the average accident rate over the total length of the route by a factor of two. In this sense the analysis puts upper bounds on the effects on risk of variation in accident rate and other important accident-related parameters. However, segment-by-segment analyses that would identify high risk could have not been performed by the DOE. The States and Indian Tribes, however, as part of the designation of alternate preferred routes under DOT routing regulations, commonly referred to as HM-164, may examine risks on small segments of highway.

QUESTIONS FROM SENATOR WIRTH

QUESTION 3:	Has the Department of Energy, or any other federal agency, ever tested to failure any of the shipping casks currently being used to ship high level nuclear waste? If so, please provide the results and documentation of such tests.
ANSWER:	No, but the cask certification test sequence specified by the Nuclear Regulatory Commission (NRC) for Type B packagings does not require that casks be tested to failure. However, Sandia has subjected spent fuel casks to tests that were more extreme than those required by the NRC. For example, the regulatory fire test calls for a 30 minute exposure to engulfing flames at 800°F. A lead shielded cask of a type now in use was fire tested at Sandia to the point of lead melt. This test was terminated after 100 minutes, over 3 times the regulatory fire duration. Longer exposure could have led to reduced shielding because of lead leakage through small fractures on the outer surface of the cask. However, had this test been an actual accident, no release of contents would have occurred because the containment system of the cask did not fail. This illustrates why testing to failure is not required. Because of the high level of accident damage resistance built into casks as a result of their being designed to meet national (NRC) and international (International Atomic Energy Agency [IAEA]) hypothetical accident tests,

failure conditions far exceed conditions that can be actually expected to occur even in very severe accidents.

QUESTIONS FROM SENATOR WIRTH

QUESTION 4: **The Department of Energy, through the Sandia National Laboratories, has subjected shipping casks to a "drop" test and to a fire test, to determine whether these accident conditions would breach the containment system. Has the Department ever subjected a cask, under conditions simulating those that would obtain if the cask contained spent fuel, to a test simultaneously involving both a fire and a puncture? If so, please provide the results and documentation of such tests.**

ANSWER: No such tests have been done because it is not typical of accident experience. The test sequence specified by the NRC requires that a cask be subjected sequentially to a drop test, puncture test, and fire test, in that order. The order is in part a result of the observation that in actual accidents, an impact type insult to a package typically precedes any fire that might occur as a result of, for example, ignition of fuel leaking from a damaged tank. In many accident scenarios (e.g. collision of truck carrying a spent fuel cask with a gasoline tank truck), impact-related damage is the means by which flammable materials are released. Scenarios in which impact-type insult to a cask might occur after or during a fire are difficult to realize. Thus, the NRC test sequence reflects not only the types of damage a cask might sustain, but the sequence in which they are most likely to occur.

QUESTIONS FROM SENATOR WIRTH

QUESTION 5: As you may know, many experts and citizens are concerned that current Nuclear Regulatory Commission regulations permit new cask designs to be certified through the use of analytical methods rather than by actual performance of the tests on sample casks. Will the Department require use of actual tests in selecting casks to be used in shipments of nuclear waste under the Nuclear Waste Policy Act of 1982?

ANSWER: Consistent with Nuclear Regulatory Commission (NRC) regulations (specified in 10 CFR 71.71 and 71.73), the Office of Civilian Radioactive Waste Management (OCRWM) will evaluate the performance of casks to be used for NWPA transportation by using engineering analyses and by testing scale-models of casks. The OCRWM does not believe that confirmatory, demonstration testing of full-scale prototype casks under conditions that exceed the NRC's test requirements is necessary to verify safe cask designs. The OCRWM plans, however, to consider the use of confirmatory testing as a method for fostering better understanding in waste-management activities and promoting public confidence in the safety of NWPA transportation. The OCRWM will determine whether confirmatory tests of prototype casks can be used effectively in the NWPA cask-development program following an evaluation of estimated test costs and continued interaction with interested parties to determine the ability to gain national consensus on acceptable test conditions. Congress, of course, would have to appropriate funds for this purpose.

QUESTIONS FROM SENATOR WIRTH

QUESTION 6:	**Will the Department require all casks used to transport waste under the Act to be certified by the Nuclear Regulatory Commission, or will the Department continue to rely on its own standards, which it determines to be "substantially equivalent" to NRC standards?**
ANSWER:	The OCRWM will use casks that are certified by the NRC for all shipments of nuclear waste to NWPA facilities. Such an intention has been announced in (1) a procedural agreement with the NRC that provides that casks approved by the NRC will be used for shipments of radioactive waste from NRC-facilities to NWPA facilities (Federal Register, Vol. 48, p. 51875, November 14, 1983), and (2) a formal agreement reached by the OCRWM and the DOE's Office of Defense Programs on July 1, 1986 that provides (in part) that waste generated in national defense activities will be transported by the OCRWM to repositories in casks certified by the NRC.

QUESTIONS FROM SENATOR WIRTH

QUESTION 7: **Will the Department subject shipments of waste generated in the defense program to precisely the same safety standards as are applied to shipments of civilian generated waste under the Nuclear Waste Policy Act?**

ANSWER: All shipments made by the DOE will be made with equivalent levels of safety.

QUESTIONS FROM SENATOR WIRTH

QUESTION 8:	The state of Illinois has adopted what many view as a model state law regulating transportation of high level waste. The law provides for prenotification, inspection, police escorts, and other important safeguards. Recently, the Department of Transportation upheld the Illinois statute against a challenge brought under the Hazardous Materials Transportation Act. However, the Department of Energy has appealed that ruling. Please explain in detail the Department's rationale for challenging a state law that the Department of Transportation, and many states, view as a reasonable regulation of high level nuclear waste transportation. In so doing, please state precisely which provisions of the Illinois statute the Department is challenging.
ANSWER:	The DOE believes that Section 4(7) of the Illinois Nuclear Safety Preparedness Act--which imposes a fee of $1000 per cask of spent fuel shipped within or through the State of Illinois--is inconsistent with and therefore preempted by the Hazardous Materials Transportation Act (HMTA), 49 U.S.C. 1801 et seq., and implementing Hazardous Materials Regulations. The DOE believes that the Illinois transit fee stands as an obstacle to Congressional goals in enacting the HMTA, which were to protect the nation against the risks inherent in the transport of hazardous materials, and to preclude a multiplicity of State and local regulations and the potential for varying as well as conflicting regulations for hazardous materials transport. The DOE presented its position in comments submitted to the Department of Transportation (DOT) during

the DOT's administrative review of the Illinois transit fee for its consistency with Federal law, and in a subsequent appeal of the DOT's finding of consistency (Inconsistency Ruling No. IR-17, Federal Register, Vol. 20926, June 9, 1986). As stated in such comments, the OCRWM believes that the Illinois transit fee stands as an obstacle to the accomplishment of the objectives of HMTA because it redirects, restricts, and delays shipments of spent fuel transportation and therefore increases transportation risks, and, if allowed to stand, will encourage other jurisdictions to enact similar requirements and increase regulatory multiplicity.

As further noted in its comments to the DOT, the DOE also believes that the transit fee discriminates unfairly against the transport of spent nuclear fuel. The DOT stated in an earlier inconsistency ruling that shipments of spent nuclear fuel, based on both shipment frequency and accident history, pose a much lower risk of transportation accident than do any number of common chemicals (IR-15, Federal Register, Vol. 49, p. 46663, November 27, 1984). Similarly, the Office of Technology Assessment, concluded in The Transportation of Hazardous Materials (July 1986) that "NRC performance standards yield spent fuel shipping cask design specifications that provide for a very high level of public protection--much greater than that afforded in any other current hazardous materials shipping activity." The DOE supports such conclusions and believes that the State of Illinois has unfairly singled out spent fuel transport by imposing a burdensome fee and a complex, time-consuming, and duplicative regulatory program.

QUESTIONS FROM SENATOR WIRTH

QUESTION 9: Even though dry cask storage systems now are commercially available, the Department states at page 10 of the draft Mission Plan Amendments that an MRS facility would still be superior to reliance upon dry cask storage because the MRS would be "an integral and productive component of the waste management system rather than a temporary reactor-specific expedient." Has the Department done a cost comparison of a system using at-reactor storage in dry casks until the first repository is available to process and emplace waste, and a system using the MRS?

ANSWER: The Department has evaluated expanded storage at reactor sites as an option for improving the no-MRS system. The results of this evaluation are contained in Volume 2 of the *December 1985 Review-Copy* of the Department's proposal to Congress on MRS and do contain cost estimates. In that document, the Department estimated that a waste system with an MRS beginning operations in 1996 and with an on-time (1998) repository would avoid at-reactor storage costs of $150-$450 million compared to a waste system with no MRS. This cost figure assumed that the MRS would provide about 4,000 tons of avoided at-reactor storage. The Department further projected the MRS could save utilities $0.6 billion to $1.7 billion if all 15,000 MTU of MRS spent fuel storage capacity were to replace additional at-reactor storage. In making these estimates, the Department assumed that maximum reracking of utilities' spent fuel pools would have already occurred. The lower end of these cost ranges

ANSWER 9: (Cont'd)

accounts for in-pool rod consolidation which remains to be demonstrated on a large scale. The upper end accounts for storage of unconsolidated fuel assemblies in metal storage casks. Under the illustrative waste acceptance schedule contained in the draft Mission Plan Amendment, which reflects a 5- year delay in the schedule for operation of the first repository, the projected additional at-reactor storage needs would exceed even the MRS's 15,000 MTU storage capacity. Therefore the higher cost range values of $0.6 billion - $1.7 billion are possibly conservative estimates for the cost of at-reactor storage of spent fuel for a waste system with no MRS and a repository which starts receiving spent fuel in the year 2003.

Storage is only one cost component of the MRS. The major projected MRS costs are associated with its proposed packaging role, a role that would be very expensive and impractical to accomplish at reactor sites. Packaging done at the MRS would significantly reduce packaging efforts that would otherwise be performed at the repository and would reduce repository costs accordingly.

QUESTIONS FROM SENATOR WIRTH

QUESTION 10: Has the Department compared the risks, costs, and impacts of at-reactor storage versus the risks, costs, and impacts of an MRS facility?

ANSWER: The Department has evaluated the alternatives for providing additional at-reactor storage capacity as a means of improving a waste system with no MRS. The options that are feasible range from modifying or reallocating existing spent-fuel storage capacity (i.e. reracking, transshipment or consolidation) to adding new onsite storage capacity (e.g., dry storage casks or vaults,). The Department estimates the cost of providing at-reactor contingency storage (after reracking has already occurred to the maximum extent possible) to range from $40/kgU *(kilogram of uranium) to $110/kgU. The low-end of this range corresponds to storage costs when in-pool fuel consolidation and storage is used and the high end of this range corresponds to dry storage of unconsolidated fuel in storage casks or vaults. By comparison, the unit costs for contingency storage at an MRS facility range from $35/kgU to $40/kgU. The lower unit cost of storage at the MRS facility results from economies of scale, and the narrower range of cost arises from the use of a single storage method.

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*Estimates for in-pool consolidation and storage remain highly uncertain with claims that these cost could be as low as $10/kgU or as high as $100/kgU.

From a system risk standpoint, additional at-reactor storage would result in higher occupational radiological exposure at reactors and would have an uncertain affect on public dose compared to an MRS system.

As indicated in the answer to the previous question, however, the proposed MRS functions go well beyond that of simply providing storage.

QUESTIONS FROM SENATOR WIRTH

QUESTION 11:	**If Congress does not authorize construction of the MRS facility, how will the Department meet its commitment to accept title to spent fuel in 1998, as required by the Nuclear Waste Policy Act, given the five-year extension in repository construction envisioned in the draft Mission Plan Amendments?**
ANSWER:	Given the five-year extension in the repository schedule, if Congress does not authorize construction of the MRS the Department would have no authorized facilities available to accept spent fuel in 1998. The utilities would continue to be responsible for storing the spent fuel at the reactor sites.

QUESTIONS FROM SENATOR WIRTH

QUESTION 12:	**The draft Mission Plan Amendment, at page 18, states that the site selection process for the first-round repository began in the late 1970s. The Nuclear Waste Policy Act was not enacted into law until 1983. What criteria, standards, and guidelines did the Department use in the screening process that occurred prior to enactment of the Nuclear Waste Policy Act? How did those criteria, guidelines, and standards compare to the guidelines promulgated in December 1984, pursuant to the Nuclear Waste Policy Act?**
ANSWER:	Prior to the passage of the Act, the DOE relied on criteria used earlier in the National Waste Terminal Storage (NWTS) Program, including its own program objectives, system performance criteria, and site performance criteria; other sets of criteria defined for geologic repositories by the National Academy of Sciences, the International Atomic Energy Agency, and earlier programs in the United States; and existing and proposed (at the time) regulations of the Nuclear Regulatory Commission and the Environmental Protection Agency. References for all these criteria may be found in the supplementary information (also referred to as the "preamble" and the "statement of basis and purpose") published with the final DOE siting guidelines. With regard to how the guidelines compare with these criteria, the guidelines integrated the then-existing criteria into its requirements and

procedures, and thus are fully consistent and compatible.

For example, great care was taken to make the guidelines compatible with existing applicable regulations of the NRC and the EPA. In fact, the guidelines refer frequently to these criteria and standards through direct quotations and paraphrasing. That the guidelines are consistent with the NRC's own technical criteria (codified as 10 CFR Part 60) was attested to by the NRC Commissioners in their final concurrence decision (49 FR 28130, July 10, 1984).

There are a number of distinguishing features between guidelines and other sets of criteria for repository siting that have been proposed that serve to make the guidelines far more comprehensive and explicit. Several of these are listed below.

- The guidelines incorporate the requirements of the Act, which are quite specific in some instances (e.g., population density criteria) and require the DOE to specify "factors that qualify or disqualify any site from development as a repository." This latter requirement led to the specification of 24 qualifying conditions for the system and technical guidelines and 17 disqualifying conditions. None of the aforementioned sets of criteria are so specific and explicit.

- The guidelines are presented in three major categories: implementation guidelines, postclosure guidelines, and preclosure guidelines. Previous sets of siting criteria have emphasized only the postclosure-type guidelines, such as geohydrology and geochemistry, since the primary and distinguishing puposed of a geologic repository is to provide for the long-term protection of public health and safety. The guidelines maintained this emphasis on postclosure performance while also introducing a number of innovative concepts in regard to preclosure siting criteria and general rules and procedures guiding the implementation of the other guidelines. These essentially fresh ideas were necessitated by the requirements of the Act and attempts to be responsive to general issues raised in the consultation, comment, and concurrence process on the guidelines. Several examples will clarify the point. Preclosure guidelines not previously emphasized in other sets of criteria include those on socioeconomics and waste transportation. General rules to be followed during siting introduced into the guidelines include provisions on diversity of geohydrologic settings and a qualitative weighting system.

- The guidelines include as an appendix the kinds of information necessary for DOE to make decisions on the nomination and recommendation of sites as suitable for characterization.

QUESTIONS FROM SENATOR WIRTH

QUESTION 13: It appears that in the Transportation Appendix to the five environmental analyses, the Department used estimates of release fractions in the event of a catastrophic accident that were initially formulated by the participants in a workshop held at Sandia Laboratories in 1980. The results of that workshop were reported in SAND80-2012. Several months after the workshop, there was an unexpected release of re-oxidized fuel pellet particles when a cask was unloaded underwater at the Battelle Laboratories in Columbus, Ohio. In that incident, the reported contamination was much higher than would have been expected. Please explain why the levels of contamination released during this incident did not cause the Department to reformulate the release fractions one would anticipate in the event of a catastrophic transportation accident.

ANSWER: The Battelle Columbus incident does not affect the workshop results. The model adopted in the workshop report includes a two-stage approach. It considers (a) mechanisms for release of fuel radionuclides into the cask cavity (e.g., crud particulates, material from failed fuel and from fuel damaged as a result of an accident), and (b) mechanism for release of material in the cavity to the external environment. Material released into the cavity from failed fuel could not be released during transport in the absence of a severe accident. The report specifically accounts for the expected fraction of failed fuel elements.

Even the most severe accident, however, would not result in release fractions equivalent to those resulting from removing the lid on a cask containing failed fuel without appropriate precautions being taken. In contrast the largest opening that could be expected to be made in a cask is about one square inch in area as a result of the highest severity of transportation accident. Making a transport accident more serious is the fact that such an accident would include a severe fire (i.e., a fire more severe than the regulatory fire). The dispersal pathways and exposure of the public in such an accident would be wider than those in an incident inside a facility such as Battelle Columbus.

The fact that the total amount of contamination released may have exceeded estimates from the workshop, in which transport accidents were addressed, does not affect either the value of the workshop results or the logical basis from which the workshop model was developed.

QUESTIONS FROM SENATOR WIRTH

QUESTION 14: Given the higher temperatures and higher degrees of radioactivity associated with fuel that has been subjected to extended burn-up, does the Department anticipate that a different type of transportation cask will be needed to ship such fuel to the repository?

ANSWER: Fuel age at time of shipment is a major factor in determining heat and radiation loads in any case. Fuel will be shipped when it is within the limits of the cask certificate for heat and radiation. Special casks will probably be unnecessary but the OCRWM cask development program will be conducting trade-off studies to determine the effect of extended burn-up on new cask designs and the need for special cask designs.

QUESTIONS FROM SENATOR WIRTH

QUESTION 15: Does the Department plan to ship nuclear waste using overweight truck or rail casks? If so, has the Department received assurance that all corridor states will permit such shipments? Will the Department seek to preempt states that do not grant such permission?

ANSWER: The OCRWM is evaluating the potential use of both overweight rail and truck casks for waste shipments to NWPA facilities. The OCRWM is now reviewing railroad weight limits and plans to consider the use of heavy rail casks as an option in the current cask-design initiative. Evaluations of the feasibility of using heavy railcars in the NWPA transportation system are being supported through a contract with the Association of American Railroads.

To support the study of the potential use of overweight trucks in the NWPA transportation system, the OCRWM is evaluating Federal and State highway weight limits, the relationship between highway damage and vehicle weight, State permit requirements, and the cost and safety factors associated with overweight trucks. At the request of the OCRWM, the American Association of State Highway and Transportation Officials has formed a task force to evaluate State permitting requirements and procedures with the objective of developing a standard permit for overweight truck shipments of radioactive materials.

The use of overweight trucks for NWPA shipping will depend largely on the ability to obtain national consensus on overweight truck permitting requirements and procedures. In general, the DOE does not consider State permitting requirements for overweight trucks to be "routing rules" that are preempted by existing DOT routing requirements for the highway transportation of radioactive materials. Appendix A of 49 CFR Part 177 offers DOT guidance on State and local "routing rules" that are considered to be inconsistent with Federal routing requirements. A State or local "routing rule" is defined in Appendix A as any action which effectively redirects or otherwise significantly restricts or delays the movement by public highway of motor vehicles containing hazardous materials, and which applies because of the hazardous nature of the cargo; traffic controls such as truck routes based on vehicle weight or size are not included in the definition if they are not based on the nature of the cargo. Consistent with such DOT guidance, the DOE has not interpreted State permitting requirements based solely on the weight of trucks--and not on the nature of the cargo--to be preempted by DOT routing regulations for the highway shipment of radioactive materials.

QUESTIONS FROM SENATOR McCLURE

Question 1:	How much of the "institutional relations" between DOE and the States are conducted by your contractors, as opposed to yourselves? Do you feel that your contractors are adequately sensitized to the needs and the roles of the States in this whole process?
Answer:	DOE personnel are responsible for conducting institutional activities with the States and Indian Tribes. In Consultation and Cooperation negotiations with affected parties, the DOE negotiating teams are composed of DOE Headquarters and Project Office personnel, and no DOE contractors participate. In less formal interactions that DOE conducts with the States and Indian Tribes, the responsible DOE personnel are supported by contractors. The meetings of the Office of Geologic Repositories coordinating groups are an example of how the DOE personnel and contractors interact with the State and Indian Tribal representatives. At the Institutional/Socioeconomic Coordination Group meeting, DOE personnel chair the meeting, make the presentations, and discuss the issues with the State and Indian Tribe representatives. Contractors assist DOE personnel in preparing for the ISCG meeting, and attend the meeting answering questions as appropriate and to assist in meeting logistics.

The needs and the roles of the States and Indian Tribes in the process are continually emphasized by DOE to its support contractors. Because of the special institutional requirements of this program, an effort is made to hire contractors who have experience in intergovernmental and institutional programs as well as the required technical experience.

QUESTIONS FROM SENATOR McCLURE

QUESTION 2: In the statements we received yesterday from the States of Washington, Nevada, and Texas, and from the affected Indian Tribes, several points were made that I feel warrant comments from you:

(a) The Washington people are concerned that certain environ-mental or technical factors were improperly weighed in the ranking process. For instance, they feel that the difference between groundwater travel times of 22,000 years (in Washington) and 35 million years (in Mississippi) are significant in the ranking process, but were essentially ignored by DOE. Do you care to comment?

ANSWER: If groundwater travel time was the sole parameter determining postclosure repository performance, and, if the groundwater travel times for the Richton Dome and Hanford sites were known with a high degree of confidence to be 35,000,000 years and 22,000 years, respectively, DOE would tend to agree that such differences would be significant. However, these premises are not true, as explained below. In addition, the issue of "how good is good enough" is also involved and is explained below.

Groundwater travel time clearly is an important indicator of performance; a travel time of 1,000 years is a performance objective of 10 CFR Part 60 and a disqualifying condition in 10 CFR Part 960. However, many other factors will influence radionuclide releases to the accessible environment, which is the ultimate postclosure performance measure. Several of these factors are radionuclide retardation, geochemical solubility of radionuclides, waste-package lifetime, and a site's resistance to changes in its natural and engineered barriers over the long-time frames important to waste isolation (see Figure 3-2 and associated text in the methodology report (DOE/RW-0074) for a more complete description of these factors.) While Hanford's range of travel times (22,000 to 83,000 years) is less favorable than Richton Dome's (10,000,000 to 35,000,000 years), the geochemical conditions at Hanford appear more favorable than at Richton Dome. As documented in DOE's methodology report, when the important factors influencing releases are considered together, releases from Hanford are on the order of 22 times those from Richton Dome. Clearly, then, the large estimated differences in groundwater travel time between these sites had an influence on performance; however, the differences in releases are not in proportion to the differences in groundwater travel times because of the presence of other compensating features at the Hanford site.

Furthermore, it is important to recognize that while differences in terms of releases between the site may exist, these releases are still only a very small fraction of the EPA release limits:

Richton Dome's releases are about 0.00011 of the EPA limits and Hanford's releases are about 0.0024 of the EPA limits. This accounts for the very small differences in desirability between the two sites.

Finally, we note that it is difficult to place high confidence in groundwater travel times for any site so early in the siting process. Uncertainties will be reduced during site characterization. Resolution of such uncertainties could lead to the conclusion that, in terms of expected releases to the accessible environment, the Hanford site is more favorable than the Richton Dome site (see discussion on pages 3-41 to 3-43 in the methodology report).

QUESTIONS FROM SENATOR McCLURE

QUESTION 2b: In the statements we received yesterday from the States of Washington, Nevada, and Texas, and from the affected Indian Tribes, several points were made that I feel warrant comments from you:

Your environmental assessments are inadequate, and, according to NRC, "overly-optimistic", and could lead to the characterization and selection of a site that may end up to be unlicensable.

ANSWER: We do not believe that our environmental (EAs) assessments are "inadequate."

We believe, that the EAs adequately fulfill their intended purpose of providing an information base on which to make siting decisions. It is important to note that the siting decisions being made now are not licensing decisions but, rather, judging which sites appear to justify the investment (in terms of time and money) in characterizing them. It is clear that licensing decisions will require more precise information and a level-of-proof unavailable at this stage of the siting process, prior to site characterization.

With regard to NRC's comments on over-optimism, we appreciate that other technical experts would disagree with the Department's judgments. Current uncertainties leave much room for reasonable and knowledgeable experts to disagree. As the NRC observed, "At this stage of the site investigation and screening process, there is inherent uncertainty in site information that can lead to alternative interpretations of data. Furthermore, resolution of uncertainties ... must await characterization." DOE plans to address NRC's concerns about over-optimism consistent with their advice, namely, as part of the development of the Site Characterization Plans.

Finally, with regard to comments that the environmental assessments "could lead to the characterization and selection of a site that may end up to be unlicenseable," this is of course a possibility, but we believe it is unlikely. We cannot predict the course of the licensing process nor would we be so presumptuous as to speak for the NRC. We would note, however, that we have taken all reasonable steps to try to ensure the licensability of the sites. For example, DOE's siting guidelines, which were used to guide the selection of sites for characterization, refer frequently to NRC's technical criteria through direct quotations and paraphrasing. In addition, DOE has and will continue to meet with the NRC prior to formal licensing to discuss potential licensing issues.

QUESTIONS FROM SENATOR MCCLURE

QUESTION 2:	In the statements we received yesterday from the States of Washington, Nevada, and Texas, and from the affected Indian Tribes, several points were made that I feel warrant comments from you: (c) The rapid closure rate at salt domes, (as measured at DOE's WIPP facility in New Mexico) precludes maintaining retrievability for 50 years as required by the NWPA.
ANSWER:	Closure rates predicted and experienced do not "preclude" retrievability. However, the rates increase the cost of maintaining retrievability.

QUESTIONS FROM SENATOR McCLURE

QUESTION 2: **In the statements we received yesterday from the States of Washington, Nevada, and Texas, and from the affected Indian Tribes, several points were made that I feel warrant comments from you:**

(d) **DOE is being overly restrictive in its interpretation of the "appropriateness" of entering C&C negotiations with affected Indian Tribes (notably, the Umatilla tribe and the Nez Perce tribe).**

ANSWER: DOE received a letter from the Nez Perce Tribe (January 14, 1987) concerning the inclusion of Indian Tribes in all eleven elements listed in Section 117(c) of the Nuclear Waste Policy Act of 1982. DOE's response to the Nez Perce Tribe's letter stated that the agency considers it appropriate to negotiate on any issues of concern to the Indian Tribes in arriving at a completed C&C agreement. DOE looks forward to entering into negotiations with the Nez Perce Indian Tribe, to continuing the ongoing negotiations with the Confederated Tribes of the Umatilla Indian Reservation, and to resuming negotiations with the Yakima Indian Nation.

QUESTIONS FROM SENATOR McCLURE

QUESTION 2: **In the statements we received yesterday from the States of Washington, Nevada, and Texas, and from the affected Indian Tribes, several points were made that I feel warrant comments from you:**

(e) DOE resists or rejects input from States and Indian Tribes in the development of guidelines and other documents. This is in sharp contrast to NRC's responsiveness to public comments when formulating its regulations.

ANSWER: DOE does not "resist or reject input from States and Tribes in the development of guidelines and other documents." The Department welcomes input from States and Indian Tribes and has provided numerous opportunities for them to comment on program documents, including, but not limited to, the repository siting guidelines, Draft Mission Plan, and draft Environmental Assessments. State and Indian Tribe participation in the coordinating groups provides regular opportunities for the affected parties to raise issues and concerns with DOE and for DOE to obtain input from them.

Although DOE has not incorporated every comment States and Indian Tribes have made, the Department has made major changes in documents. For example, in response to State and Indian Tribal comments on the repository siting guidelines, DOE added several qualifying and disqualifying conditions and added much more detail for the site-selection process. In response to comments on the Mission Plan, DOE significantly expanded the scope and level of detail. Finally, DOE conducted several additional studies, gathered additional information, and revised its approach to ranking sites in the draft Environmental Assessments in response to comments. More recently, DOE has extended the schedule for the first repository, partly in response to suggestions from States and Indian Tribes. These actions, of course, only highlight the Department's responsiveness to State and Indian Tribe input. DOE's response to all State and Indian Tribe comments is explained in comment response documents or chapters, for all major guidelines and documents, or by correspondence with State and Indian Tribe officials.

QUESTIONS FROM SENATOR McCLURE

QUESTION 3: You state in your written testimony that "daily opportunities represent the spirit and intent of the requirements regarding participation, consultation, and cooperation." Yet that's not how I'm hearing it from the States. And that's not how I read Section 117 of the Nuclear Waste Policy Act, regarding Consultation and Cooperation with the States and Indian Tribes. And that's not what the GAO report to this committee concludes. In fact, GAO concludes that "DOE has not allowed them (States and Indian Tribes) to participate in the program to the extent intended by the Act." What are you doing to correct these obvious deficiencies in your relationship to the States and Indian Tribes?

ANSWER: To be more responsive to the needs of States and Indian Tribes, DOE is currently working on further developing the consultation and cooperation process in addition to the negotiation of C&C Agreements and is formally identifying operating principles, program operating procedures and new C&C initiatives. For example, DOE has recently opened all of its technical coordinating groups to States and Indian Tribal participation. Also, we are moving ahead on Facility-Specific Outreach and Participation Plans. These plans detail the institutional activities that will be conducted at each site to inform and involve affected parties during site characterization. Discussions are also being held with representatives of the States, Indian Tribes, and local governments to determine where they would like to focus their attention in terms of their own participation and involvement. In response, DOE is building into the repository development schedule specific opportunities for interaction with affected parties.

QUESTIONS FROM SENATOR McCLURE

QUESTION 4: You have a perfect role model in your DOE counterparts in New Mexico, who went through the difficult process of formalizing a C&C agreement with the State with respect to the construction and operation of the Waste Isolation Pilot Project (WIPP), which will store low-level and transuranic wastes from DOE defense programs activities. Have you consulted at all with these people to find out how their process worked?

ANSWER: The C&C Agreement adopted for WIPP can indeed be instructive in providing guidance to the NWPA program. OCRWM personnel are in regular contact with DOE Defense Programs to learn as much as possible regarding their experience to date. For example, in March 1985, OCRWM Headquarters personnel visited WIPP and developed a paper on "Lessons Learned: Waste Isolation Pilot Plant (WIPP) Project." In late 1985, at our request, senior DOE officials from Albuquerque Operations Office and the WIPP site came to Washington to brief Mr. Ben C. Rusche and senior staff on "lessons learned." This was considered so useful that a determination was made to conduct more detailed interations between the two professional staff units. For the past few months, we have worked closely with WIPP staff to develop an agenda and faculty for this one-on-one training. Arrangements have been completed to present the training in two sessions -- once in April and again in June 1987.

At the ISCG meeting held on March 11 in Albuquerque, New Mexico, a former State legislator from the State of New Mexico gave a presentation on the State legislative perspective on the WIPP experience.

QUESTIONS FROM SENATOR McCLURE

QUESTION 5: **One of the major criticisms I heard in yesterday's hearing was that DOE all but ignores public comments on the various documents it prepares (siting guidelines, Mission Plan, Environmental Assessments, etc.). Now you're saying that the Site Characterization Plans are being prepared, and you will solicit comments from NRC as well as the public. I hope you will not take NRC's comments lightly, for the key to this whole process is the licenseability of the facility. Furthermore, I hope you'll be receptive and responsive to public comments for this would greatly improve your credibility in the eyes of those most closely affected by your work.**

ANSWER: Consultation with States, Tribes, agencies, and the public during preparation of the Site Characterization Plan (SCP) has been a major consideration and has been incorporated throughout the program. In 1983, public hearings were held in the vicinity of sites being considered for nomination, to receive comments on issues to be addressed in the SCP. Input received was documented, evaluated, and incorporated as appropriate in the SCP, as were any site characterization-related comments received on the Environmental Assessments. Status of the SCP and comments regarding its preparation are discussed during the Quarterly information meetings conducted with States and Tribes. States, Tribes, and agencies are notified of and invited to participate actively in all meetings between DOE and the NRC regarding the SCP. Since February, 1985, there have been six such meetings; one on DOE's Annotated Outline for preparation of the SCP, two on performance allocation, two on the level of detail to be presented in the SCP; and one, held on March 3-4, 1987, on the Issues Hierarchy and Issue Resolution Strategy. DOE Project Offices hold routine briefings for States and Tribes, and HQ and Project Office personnel have offered to meet with States/Tribes at their request to discuss matters pertaining to the SCP. Draft chapters of the SCPs are being provided to States and Tribes for their early review.

DOE will continue to follow all NWPA requirements for consultation and public interaction in the preparation and issuances of the SCP. All comments received during the public comment period will be evaluated and responded to in comment response documents prepared by the Project Office and reflected in periodic progress reports. Technical comments received will be incorporated as appropriate in planning documents such as specific study plans.

QUESTIONS FROM SENATOR McCLURE

QUESTION 6: You say that your decision to postpone second repository work was "responsible fiscal management". Yet, if you really intend to eventually do this work at some point, wouldn't it be cheaper to proceed with the site selection activities now, while your coffers are overflowing, and before inflated construction costs take over? And what do you say to the "responsible fiscal management" of throwing away all the work you have done on the second repository sites? (How much did that cost?) And what do you say about the "responsible fiscal management" of choosing a site--namely Hanford--where total program expenses could be as much as $4 billion more costly than the other sites considered?

ANSWER: The Department's draft Mission Plan Amendment discusses several reasons for delaying the second repository siting activities. As indicated in the Amendment, the plan presented for the second repository in the June 1985 Mission Plan would require the Department to spend nearly $700 million through the year 1993 for siting activities leading to site characterization. Under the revised program, expenditures through the year 1993 should total about $200 million. (Expenditures through Fiscal year 1986 on the second repository program have been about $74 million.) Information and data already obtained in conjunction with the second repository effort will be retained and used, as appropriate, in conjunction with site selection when it is resumed.

Delaying major expenditures for the second repository should strengthen the financial position of the program by allowing additional time for earning a return on Nuclear Waste Fund investments. A small percentage of these savings, however, will be offset by the need to continue some second repository activities longer than would otherwise be necessary. These effects are being investigated and will be discussed in the next annual fee adequacy report to be submitted to the Congress.

The selection of the three first repository candidate sites was based on several factors including health and safety considerations, environmental impacts, geophysical suitability of the sites, socioeconomic considerations, as well as potential costs. Estimated cost is only one factor. It should be noted that there is a high degree of uncertainty associated with the cost estimates at this time. The estimates are based upon pre-conceptual designs and without the benefit of data to be gained during site characterization. The estimates are, therefore, very preliminary and may not accurately represent cost differentials between sites. The Hanford site has the highest estimated system costs of the three candidate sites, but this in itself should not preclude a site from further consideration, given the importance of the other factors, such as health, safety and impacts on the affected communities.

QUESTIONS FROM SENATOR McCLURE

QUESTION 7: **You stated that the Tennessee court decision in your favor reinforces your view that you have not violated the Act with respect to your actions to date on MRS. There are many other cases pending--including a few that relate to your decision to indefinitely postpone second repository activities. What if the courts do not rule in your favor in these cases?**

ANSWER: The Department will, of course, abide by the final decisions of the courts in all cases or seek legislative relief in its effort to implement the Nuclear Waste Policy Act.

QUESTIONS FROM SENATOR McCLURE

QUESTION 8: In your written testimony, you say that, "our intent regarding MRS is to fulfill our statutory obligations under that Act and submit the proposal on MRS to the Congress at the earliest date practicable." Why are you so intent on fulfilling your statutory obligations regarding MRS, when you are ignoring your statutory obligations with respect to the second repository work?

ANSWER: The Mission Plan Amendment seeks clarification from Congress on the second repository schedule. With regard to MRS, the Department considers that the preferred approach for meeting the intent of the NWPA and its contracts with the utilities includes an integral MRS facility. This approach also achieves the broader goal of improved operating efficiency for the system. Accordingly, the Department has, on March 31, 1987, submitted the MRS proposal to the Congress.

With respect to the second repository, the Department felt obligated to describe the course and timing that the first and second repository programs should take given current circumstances based on our considered and informed judgments and actual experience in administering these programs.

QUESTIONS FROM SENATOR McCLURE

QUESTION 9: You state that you intend that the Mission Plan amendments will help Congress to provide DOE with the direction they need for the conduct of the program--let me remind you, first of all, that we have already provided you with the direction we want you to take--that can be found in Public Law 97-425, the Nuclear Waste Policy Act of 1982. And let me remind you, second of all, that there is nothing in the Act that requires Congress to respond in any form to the Mission Plan--nor does the Act mention at all the process of amending the Mission Plan. So I'm just warning you, do not be disappointed if you do not receive a formal Congressional response to your new document.

ANSWER: We would hope Congress will act favorably and quickly on the proposed Mission Plan Amendment when it is formally submitted to Congress since we consider that the revised plan and schedules presented there represent the best way to proceed with the program.

QUESTIONS FROM SENATOR HATFIELD

QUESTION 10: **The Hanford Nuclear Reservation has been the site of significant nuclear waste activities for over 40 years. Accordingly, a large portion of the Reservation has been exposed to radioactivity. If Hanford were chosen as the repository site, would the Department be able to distinguish leaking radioactivity from the repository from other radioactive contamination on the reservation?**

ANSWER: If plutonium production, defense waste storage, and a commercial waste repository operate concurrently at Hanford, there are several feasible approaches of identifying the specific source of any radionuclide releases that are detected. The approach best suited to a particular situation depends in large measure on the specific characteristics of the facilities and processes making up the overall system. For example, physical separation of individual facilities and incorporation of various monitoring devices proximate to each facility might preclude the possibility of any difficulties in identifying the source of airborne, surface, or subsurface contamination. Similarly, the source of contaminants detected at subsurface locations could very likely be traced by hypothesizing potential sources and then sampling groundwaters along predicted pathways from those sources. Another aspect of the detection approach could involve the distinctive signatures associated with specific waste forms. The geologic-repository monitoring approach is still years away from precise definition, and will be developed as part of the site characterization program and subjected to review by the regulatory agencies.

QUESTION FROM SENATOR HATFIELD

QUESTION 11: **The Committee has heard testimony that one of the reasons that the Department has decided to postpone its search for a second repository is because the projected volume of commercial waste is significantly less than originally forecast. It is my understanding, however, that the Department is considering transferring defense waste which now is contained in the single-shell tanks at Hanford into the high-level repository upon its completion. This would dramatically increase the volume of waste that would be placed in the repository. Would this not indicate that a second repository is needed? What is the volume of this defense waste that will be placed in a repository.**

ANSWER: On May 28, 1986, the Secretary of Energy announced his decision that it would be prudent to postpone site-specific activities for the second repository. This decision does not mean that a second repository is not needed. The draft Mission Plan Amendment indicates that a second repository will be needed, but not until after the year 2020.

There is uncertainty in the defense waste projections, just as there is in the spent fuel projections. The current planning projection for defense waste is 16,000 canisters. This does not include the waste currently stored in the single-shell tanks at Hanford. The Department is conducting an environmental assessment of the

Hanford waste to determine the appropriate disposal technique. No decision has been made at this time regarding disposal of this waste. This decision will not, however, influence the need for a second repository, since the 1986 EIA spent fuel projections, even at the lowest current projection, indicate that a second repository will be needed, nor would it mean a "dramatic" increase in the total volume of material requiring disposal.

QUESTIONS FROM SENATOR HATFIELD

QUESTION 12: It is theorized that there are several underground aquifers beneath Hanford. Can the Department [of Energy] tell us how many aquifers they will have to drill through at the Hanford Site and what the pressures of the aquifers [water pressures] are suspected to be?

ANSWER: One unconfined aquifer and approximately eight confined aquifers exist beneath the Hanford Site in the sediments and basalts lying between the land surface and the proposed repository depth. The water pressures encountered will vary from atmospheric pressure (14.7 psi) to a maximum of about 1250 psi.

The unconfined aquifer occurs in the sedimentary beds of the Hanford and Ringold Formations that overlie the thick sequence of basalt flows. As reported in the final Environmental Assessment (May 1986) for the Basalt Waste Isolation Project, the principal confined aquifers within the basalt sequence exist in selected sedimentary interbeds and basalt flow tops of the Saddle Mountains and Wanapum Basalts. (Here, the term "aquifer" is used to denote a saturated stratigraphic interval capable of a sustained water yield of about 10 gallons per minute.) Within the Saddle Mountains Basalt, the Rattlesnake Ridge, Cold Creek, and

Mabton interbeds are frequent sources of large groundwater supplies, in addition to those in flow tops of the Elephant Mountain and Umatilla Members. Some individual flow tops within the Priest Rapids, Rosa, and Frenchman Springs Members of the Wanapum Basalt are also known to be aquifers. Few aquifers appear to exist within the Grande Ronde Basalt beneath the Hanford Site.

Within the Pasco Basin, the principal aquifers tapped for large-scale irrigation are the sedimentary interbeds and basalt flow tops of the Saddle Mountains and Wanapum Basalts.

When labelling a stratigraphic interval as an aquifer, it is important to remember that hydraulic properties can vary significantly within a formation and, therefore, what is termed an aquifer in one location may not qualify as such at another location. For example, the Vantage interbed is a very productive aquifer in the western half of the Columbia Plateau in Washington State. There, it consists of coarse-grained (sand and gravel) river deposited sediments. Farther east, beneath the Hanford Site, the Vantage mostly consists of low permeability silts and clays or is completely absent from the stratigraphic section. In like fashion, the Grande Ronde Basalt can include several very productive aquifers that contain good quality water along the margins of the Columbia Plateau where the formation lies at or close to land surface and can contain numerous sedimentary interbeds. In the Grande Ronde, beneath the Hanford site, few zones of high permeability are present, interbeds are thin to absent, and the groundwater quality is poor because of high fluoride, boron, and sodium concentrations and high salinity.

By using an average repository depth of 3150 feet below la surface, a land elevation of 625 feet above sea level and hydraulic head of 403 feet above sea level, a water pressu of approximately 1250 psi is calculated at the depth of the proposed repository.

The Department of Energy is planning a thorough evaluation of the aquifers beneath Hanford, Washington. The plans will be available in the fall of 1987.

QUESTIONS FROM SENATOR HATFIELD

QUESTION 13:	**The city of Portland's Bureau of Water Works has theorized that a huge underground aquifer extends from beneath eastern Washington and eastern Oregon, along the Columbia River to the western reaches of the two states. What activities does the Department [of Energy] intend to do to ascertain whether or not such an aquifer exists?**
ANSWER:	The Department of Energy (DOE) and the U.S. Geological Survey (USGS) are involved in independent as well as cooperative activities in assessing regional groundwater flow in the basalts of the Pacific Northwest. Such regional studies cover 1000s to several tens of 1000s of square miles. Individually and collectively, these studies enclose a large portion of the territory lying between the proposed repository site and Portland.

The DOE is involved in or is undertaking the two regional hydrology studies discussed below:

1) Since the early 1980's, personnel from the DOE, USGS, Rockwell Hanford Operations (RHO), and Pacific Northwest Laboratory (PNL) have participated in an Interagency Hydrology Working Group (IHWG). This group was formed to share hydrologic data, identify conceptual flow model differences, and seek resolution of conceptual model differences through numerical modeling. The general area covered in this

study includes the Pasco Basin and the eastern half of the Horse Heaven Basin (Figure 131). The Horse Heaven Basin lies south to southwest of the Hanford site, i.e., directly between Hanford and Oregon.

In the IHWG, the USGS has shared interpretive hydrologic information that will not be otherwise available until the USGS has completed its interpretations and formally published the results.

2) As part of the DOE site characterization studies, RHO is now writing study plans for conducting an independent groundwater modeling study focusing on the Pasco Basin and adjoining area. The study will have two purposes. First, it will examine the groundwater flow dynamics (e.g., recharge rates, discharge rates, flow directions, vertical groundwater flux between geologic units, and influence of major geologic structures) in the shallow to deep basalts. Second, it will define boundary conditions for repository performance assessments studies. A summary of these study plans will be written into the Site Characterization Plan scheduled for release in

1987. Details will be published in the study plans themselves.

The USGS is independently involved in two hydrology studies assessing regional groundwater flow in the Columbia River Basalt. These studies are summarized below:

1) In 1983, the USGS initiated a fouryear study of the Columbia Plateau as part of its national "Regional AquiferSystem Analysis" (RASA) program. This particular RASA study was implemented to describe the geohydrology, geochemistry, and regional groundwater flow in the Columbia River Basalt Group of the Columbia Plateau. The RASA program is a national effort by the USGS to systematically assess regional groundwater systems considered important to the Nation's water supply. The Columbia Plateau study area covers approximately 70,000 square miles (Figure 132). Results are planned for release in 1988 or 1989. Whereas the RASA study is not intended to directly support the Basalt Waste Isolation Project (BWIP), the DOE will compare RASA and BWIP regional study results after they are reported.

2) The USGS has conducted a water resource evaluation covering an area enclosed by the

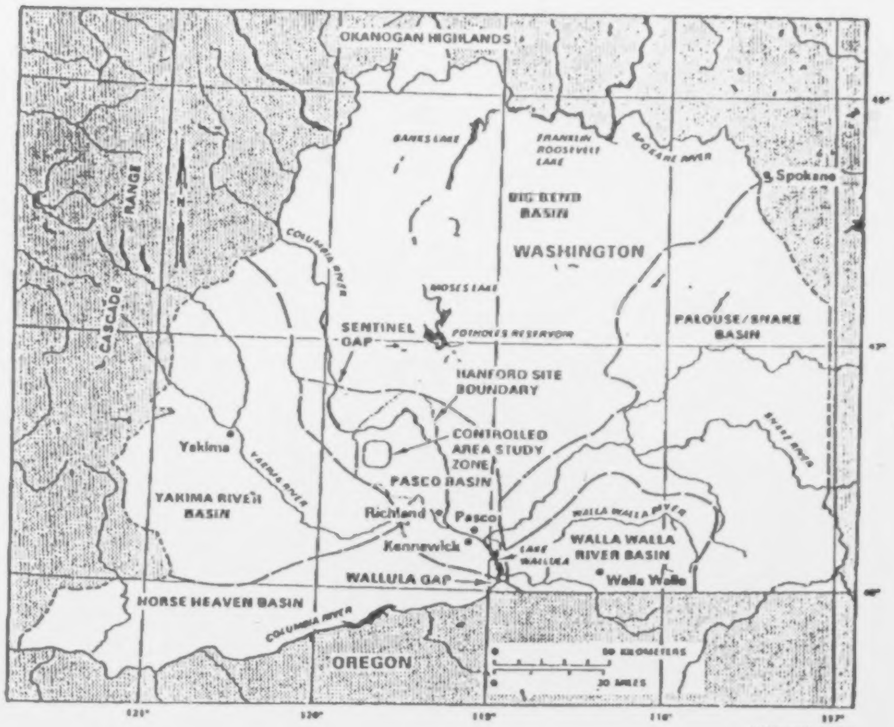
southeastern portion of the Yakima River Basin and most of the Horse Heaven Basin (Figure 13-1). This work is referred to as the Horse Heaven Hills Study. The study was requested by the Washington State Department of Ecology to better understand the local groundwater system with respect to allocating wateruse permits. Publication of field tests and numerical modeling of groundwater system behavior is planned in 1988.

It is important to emphasize that the above USGS studies are for water resource management purposes. Study results and supporting data will be examined for their use and/or referenced by DOE during site characterization studies.

The studies identified above help assess the general continuity of aquifers between the Hanford Site and the groundwater basins located south to southwest of Hanford. If hydraulic continuity (via aquifers) exists between Hanford and the Portland area, groundwater would flow south to southwest through these basins. If continuity does not exist between these basins and Hanford, it would not exist between Hanford and Portland. Additional

> studies might be required if hydraulic continuity were found likely to extend to Portland.

It is recognized that geologic continuity exists between basalt formations across a large portion of the Columbia Plateau (Figure 13-3). However, the extent of hydrologic continuity, if any, through these basalts remains to be assessed. The studies given above will help in that assessment.


OKANOGAN HIGHLANDS
BANKS LAKE
FRANKLIN ROOSEVELT LAKE
SPOKANE RIVER
Spokane
BIG BEND BASIN
WASHINGTON
CASCADE RANGE
N
COLUMBIA RIVER
MOSES LAKE
SENTINEL GAP
POTHOLES RESERVOIR
PALOUSE/SNAKE BASIN
HANFORD SITE BOUNDARY
SNAKE RIVER
CONTROLLED AREA STUDY ZONE
Yakima
YAKIMA RIVER
PASCO BASIN
YAKIMA RIVER BASIN
Richland
Pasco
WALLA WALLA RIVER
Kennewick
LAKE WALLULA
WALLA WALLA RIVER BASIN
Walla Walla
WALLULA GAP
HORSE HEAVEN BASIN
COLUMBIA RIVER
OREGON
50 KILOMETERS
30 MILES
121°
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119°
118°
117°
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46°

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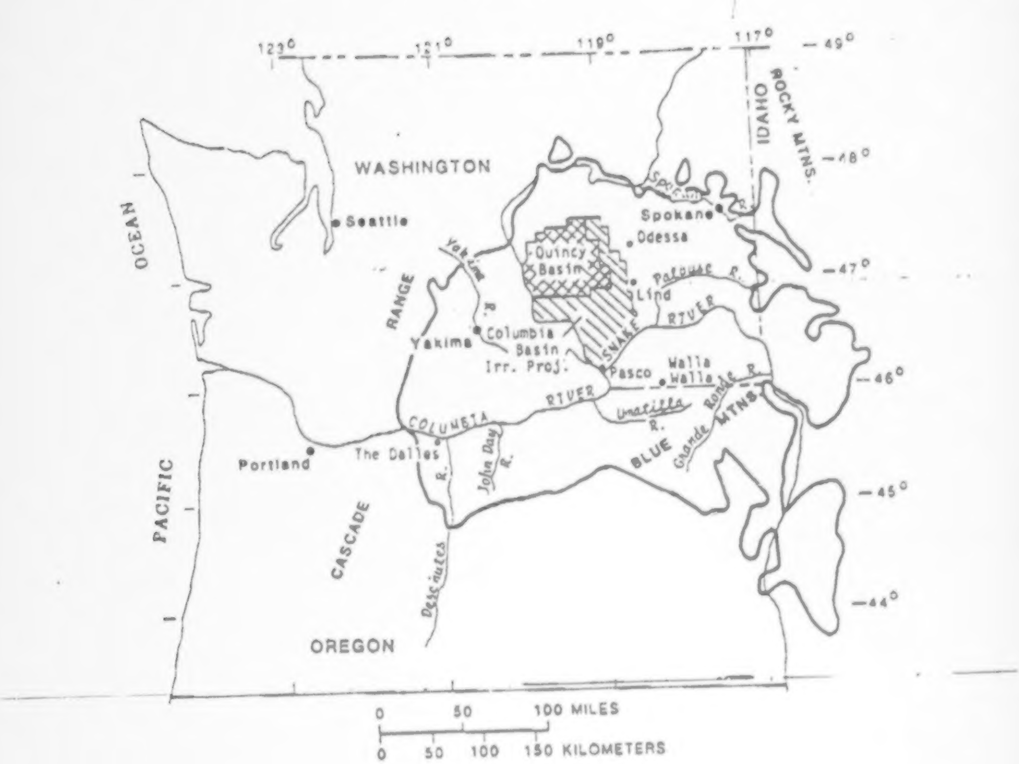
Figure 13-1 - Hydrologic Basins Designated for the Washington State Portion of the Columbia Plateau



123°
121°
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49°
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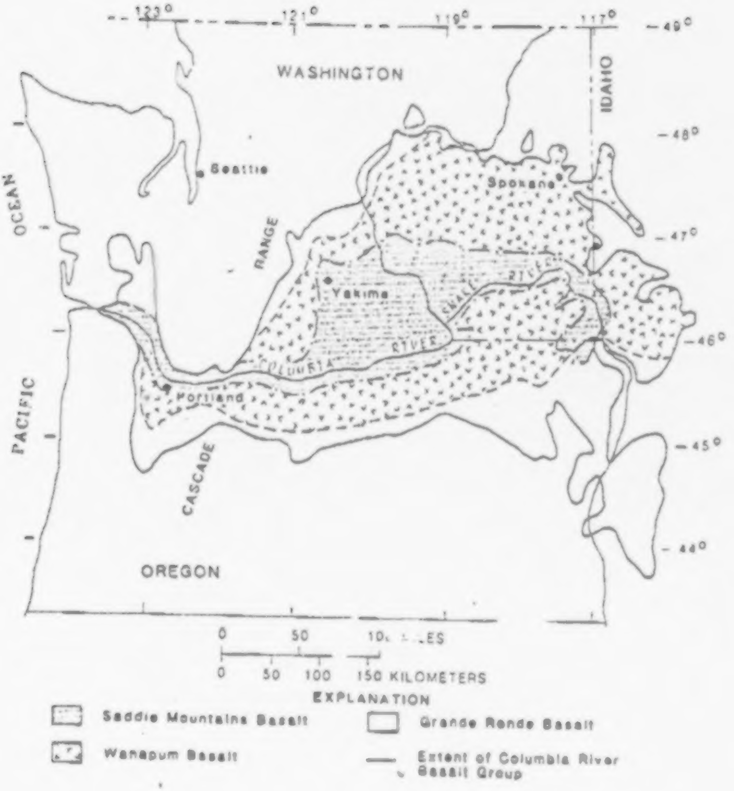
44°
WASHINGTON
IDAHO
ROCKY MTNS.
Seattle
Spokane
Spokane R.
Odessa
Quincy Basin
Palouse R.
Lind
SNAKE RIVER
Yakima R.
Yakima
Columbia Basin Irr. Proj.
RANGE
Pasco
Walla Walla
Grande Ronde R.
COLUMBIA RIVER
Umatilla R.
BLUE MTNS.
Portland
The Dalles
John Day R.
Deschutes R.
CASCADE
PACIFIC OCEAN
OREGON
0 50 100 MILES
0 50 100 150 KILOMETERS

Figure 13-2 - Location of the Regional Aquifer-System Analysis (RASA) Program Study Area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OREGON
PACIFIC
OCEAN
Seattle
Spokane
Yakima
Portland
CASCADE
RANGE
COLUMBIA RIVER
SNAKE RIVER
0 50 100 MILES
0 50 100 150 KILOMETERS
EXPLANATION
Saddle Mountains Basalt
Wanapum Basalt
Grande Ronde Basalt
Extent of Columbia River Basalt Group

Figure 13-3 - Extent of Columbia River Basalt Group and Its Three Major Formations

QUESTION FROM SENATOR DOMENICI

QUESTION 14: $79 million of the total $499 million that Congress appropriated to your program for FY87 is being withheld until the Department has shown to our satisfaction that they have made good faith efforts to work with the States and Indian Tribes on Consultation and Cooperation Agreements. We feel it would be beneficial to us as well as to the Department for the Office of Civilian Radioactive Waste Management (OCRWM) to provide the Committee with documentation of all phone calls, letters, and meetings that OCRWM has initiated towards this effort since the FY87 Appropriations bill was passed. Could you please provide us with this information?

ANSWER: If one interpreted this question in its broadest possible context, it would be a monumental task to assemble the thousands of pieces of correspondence and information. In an aattempt to be responsive to the spirit of this question, we have highlighted below a summary documentation of key C&C meetings and actions taken since passage of the FY87 Appropriations bill:

- On November 19, 1987, following Presidential approval of the sites identified for characterization, DOE sent formal requests to each affected State and Tribe to begin one-on-one negotiations with the Department toward the development of Consultation and Cooperation Agreements (C&C).
- On November 20, 1987, DOE personnel met in New Orleans with representatives of the States and Tribes to discuss informally the definition of C&C and ways to improve consultations and cooperation

between the Department and affected parties. It was agreed to pursue C&C on a dual-track approach--(a) revise the Mission Plan to better define the process and (b) develop an action plan to implement new approaches.

- On December 8, 1987, the OCRWM Associate Director for Geologic Repositories met in Las Vegas, Nevada with representatives of the States and Tribes for discussions of ways to improve State/Tribal/Federal relations.
- The amended Mission Plan, issued on January 28, 1987, contains a description of the C&C process, including several proposed new initiatives to encourage C&C negotiations.
- In consultation with the States and Tribes, DOE has opened the regular quarterly meetings with the States and Tribes to the public and the press. The first such open meeting was held in Spokane, Washington on February 12, 1987. On the previous day, DOE officials from Washington, D.C., met informally at their invitation with State and Tribal representatives to discuss was to enhance the coordination and cooperation process. The DOE also met a few hours later with a smaller representative group to describe DOE's plans to strengthen its management through the selection of a Systems Engineering and Development contractor.

- For more than six months, at the regular Institutional and Socioeconomic Coordinating Group (ISCG) meetings, which are attended by representatives of the affected States and Indian Tribes, proposed guidelines for C&C have been presented by DOE personnel, and suggestions from the States and Tribes are being incorporated in revised drafts. At the Spokane meeting, draft copies of the Financial Assistance Guidelines were distributed to the States and Tribes as an interim Department policy statement until the issuance of a formal rule following a standard rulemaking process.
- At a meeting with State and Tribal representatives (ISCG) March 10-12) a primary topic of discussion was an upcoming rulemaking on grants and financial assistance under the Nuclear Waste Policy Act. States and Tribes were invited to identify any major areas of concern to be resolved.
- At the Spokane meeting, all affected States and Tribes were informed that in the future, all twelve Coordinating Group meetings will be open to their representatives.
- On February 13, 1987, DOE agreed [illegible] provide support to the affected Tribes to prepare impact assistance reports, which would go to the Secretary as part of the information he would use in the event he

recommended a first repository site affecting the Tribes.

- On February 9, 1987, a meeting was held in Richland, Washington with representatives of the States of Washington and Oregon and the Yakima Indian Nation, Umatilla Confederated Tribes, and Nez Perce Tribe to discuss the planned scope of work of the Basalt Waste Isolation Program for Fiscal Years 1987 and 1988 in areas of ongoing and planned licensing, engineering, geoscience, and institutional activities. This review and discussion was specifically designed to aid the State and Tribal representatives in preparing their grant proposals for the same periods.
- During the week of February 22,1987, representatives of the Salt Repository Project Office visited the communities near the Deaf Smith, Texas salt repository site to attend public meetings for the purpose of discussions planned for moving the Office to Texas and beginning field activities for site characterization. These meetings were also held to respond to questions and to receive suggestions for program improvement and closer consultation and cooperation with the public.
- On February 27, 1987, the representatives of the States of Washington, Oregon, and the three affected Indian Tribes were invited to participate

in a training program for Quality Assurance Auditors (those who periodically monitor the aspects of the repository program related to the quality of planning, operations, and record-keeping which are important to NRC licensing, along with DOE personnel. This training will help the States and Tribes perform their important tasks of independent evaluation of the technical quality of the civilian nuclear waste management program, in coordination with the Federal program.

- In February 1987, the U.S. General Accounting Office recommended that the Secretary of Energy take four specific steps to enhance DOE relations with States and Tribes. The Department has reviewed this report and is accepting all recommendations.
- In March, DOE announced to States and Tribes that procedures are being developed to provide for a maximum 90-day review procedure for grant applications submitted to the Department under NWPA.
- The heart of NWPA's consultation and cooperation process is, of course, the day-to-day interactions between DOE Project Offices and the States and Tribes.

- On March 9, 1987, an informal meeting was arranged by the National Congress of American Indians for DOE nuclear waste program officials to meet with representatives of the Yakima and Nez Perce Indian Tribes to discuss matters of current interest.

- On March 10, 1987, DOE participated in an afternoon of dialogue between Tribal leaders, NRC, EPA, and Congressional staffers, on the status of the high-level waste program.

QUESTIONS FROM SENATOR EVANS

QUESTION 1: Generally, do you believe that the Department has the authority through amendments to the Mission Plan to eliminate or substantially alter provisions of the Nuclear Waste Policy Act (NWPA) that require the President and the Secretary to submit plans and develop sites by certain dates?

ANSWER: No. The Department has no authority to unilaterally change the NWPA through amendments to the Mission Plan.

The schedules set forth in the draft amendments to the Mission Plan were based solely upon programmatic judgments. They were not intended to set forth any particular legal position, but rather to describe the Department's considered and informed judgments, based on its actual experience in administering these programs, of the course and timing that the first and second repository program should take given current circumstances. DOE recognizes that carrying out these programs in the way described in the proposed amendments to the Mission Plan will require Congressional approval.

QUESTIONS FROM SENATOR EVANS

QUESTION 2: **Why has the Department waited until now to submit its amendments when the program changes which you are proposing seem to have already been decided (indefinite postponement of 2nd repository, missed deadlines)?**

ANSWER: The Department publicly announced on May 28, 1986, the intent to indefinitely postpone site-specific work for the second repository while maintaining a technology development program. Various Congressional committees and staffs were briefed at that time. In testimony before Congress, Secretary Herrington committed to document the basis for these actions and the proposed new program in an amendment to the Mission Plan and submit it to Congress for information and statutory direction.

Preparation of the Mission Plan Amendment began at that time. During the preparation of the amendment regarding the second repository, it became evident that other program changes should also be included in the amendment and submitted to Congress. These included the extension of the date for beginning operations at the first repository and reporting on the status of the MRS. The Department incorporated this information and provided an advance copy of the draft of the amendment to Congress for information as it

ANSWER 2: CON'T

considers the Department's fiscal year 1988 budget request.

QUESTIONS FROM SENATOR EVANS

QUESTION 3: In response to a request from Senator Simpson on the legal questions surrounding the indefinite postponement of the 2nd repository program, the General Accounting (GAO) wrote: "...submitting an amendment to the mission plan would not, as a legal matter, vitiate compliance with the statutory deadlines, if that in fact occurs. Without action by Congress to change the deadlines, a failure by the Administration to meet the deadlines, whether willful or otherwise, would violate the Act." Why hasn't the Department requested a change in the NWPA when it openly admits that it has not and will not meet many of the statutory deadlines set forth in Section 112 and 114?

ANSWER: The Department considers that the appropriate course of action at this time is to complete the Mission Plan Amendment and formally submit it to Congress for information and statutory direction. As indicated above, we recognize that carrying out the programs as described in the Draft Mission Plan Amendment will require Congressional approval. We are using the Mission Plan Amendment as the vehicle to make needed recommendations based on what has been learned to date from administration of the statute.

QUESTIONS FROM SENATOR EVANS

QUESTION 4: **The NWPA specifically directs the Department to** nominate five sites for consideration as a second repository not-later than July 1, 1989. Last year's Continuing Resolution states: "The conferees believe that the surest course for the DOE lies in careful implementation of the Nuclear Waste Policy Act...." Isn't this ample evidence that the Congress has clearly gone on record that DOE should follow the entire Act, and not proceed with selective implementation of its provisions?

ANSWER: In testimony last year, Secretary Herrington advised that the Department's proposal for certain schedule and program revisions would be documented in a Mission Plan Amendment and submitted to Congress for information and statutory direction. The Department has drafted such an amendment and has submitted it to States, Indian tribes, and Federal agencies for review prior to formal submission to Congress.

QUESTIONS FROM SENATOR EVANS

QUESTION 5: **Was the funding reduction in the Civilian Nuclear Waste Program called for in last year's CR applied against the entire program as specified?**

ANSWER: The funding reduction called for in the FY 1987 Continuing Resolution was applied against all segments of the program with the exception of Second Repository activities. An amendment to the FY 1987 budget request reduced the funding level for Second Repository activities from $78.7 million to $19.8 million. This reduced funding level remained constant at $19.8 million.

QUESTIONS FROM SENATOR EVANS

QUESTION 6: **When did the Department complete the Multi-attribute Utility Analysis (MUA) it prepared for the five first repository candidate sites? When did work begin on the Recommendation Report? What is the Department's rationale for reaching a decision on what sites to recommend before their decision-aiding methodology was even complete?**

ANSWER: The MUA was sent to the printer on May 5, 1986. Work began on the recommendation report on April 4, 1986, when a meeting was held between DOE management and Weston consultants regarding the need for and content of an overview document on the recommendation. A first draft of this report was available on April 9, 1986. However, at this point, no decision on which sites to recommend had been made. The actual decision was made by the Secretary several weeks later. The Secretary's approved recommendation report went to the printer on May 27, 1986. Thus, there was a several week period during which the reports were not prepared in parallel.

Two additional points should be made in regard to this timing issue. First, during the time the two reports were being prepared in parallel, no numerical results whatsoever were changed in the methodology report. The methodology report was being edited for clarity and brevity, and for consistency with its intended purpose as a decision-aiding tool. Certainly all the major insights from the methodology report had been communicated to the Director, OCRWM, by the time the first meeting discussing the need for a recommendation report was held.

Second, since the methodology was never intended or designed to make the site-recommendation decision, we do not regard the parallel preparation of the two documents as irregular.

QUESTIONS FROM SENATOR EVANS

QUESTION 7: **Has the Department made an official response to the report prepared by Ralph Keeney, the consultant who developed the methodology used in the MUA and contributed significantly to early drafts, which concludes that the site portfolio selected by DOE is not supportable?** If any official or unofficial response has been made, please submit it to the Committee for the record.

ANSWER: DOE has briefly addressed Professor Keeney's analysis in a letter dated February 18, 1987, from B. Rusche to Congressmen Markey, Swift, and Wyden. We quote below the reference in that letter to Professor Keeney's analysis.

> "Professor Ralph L. Keeney, who participated in the development of the MUA, has on his own initiative recently conducted a partial portfolio analysis. While we disagree with the conclusions and recommendations Professor Keeney derives from his new analysis, we believe it supports the long-standing principle that diversity should be an important factor in siting. Furthermore, we believe that the results of the analysis support our conclusion that a formal portfolio analysis would not yield major new insights that would lead to a different choice of sites."

QUESTIONS FROM SENATOR EVANS

Question 8:	**Why wasn't geologic diversity included as one of the criteria in the MUA, particularly given the fact that the consultant who developed the methodology for the Department strongly suggested its inclusion? If time was a constraining factor (i.e. concern over a delay of several weeks), why are you only now submitting an amendment to the Mission Plan to extend the first repository program by five years?**
Answer:	With regard to the judgment not to perform the additional portfolio analysis needed to consider the effects of rock-type diversity, as in any formal siting study, decisions had to be made about what and what not to include in the formal analysis. It was our judgment that the extra time, cost, and effort necessary to perform a formal portfolio analysis was not required to make a responsible decision. A rigorous, formal evaluation of the effects of diversity would require a more complex form of analysis involving highly speculative judgments about such things as future licensing actions. Instead, we considered the portfolio effects qualitatively, as is commonly done in other portfolio-type problems. We believe such an approach is entirely consistent with the Act and the siting guidelines. As indicated above, time was a factor but it was not a "constraining factor." Perhaps most important was our belief, which has since been

further supported by some new analysis (see response to previous questions), that a formal portfolio analysis would not reveal important new insights about the desirability of combinations of sites, and thus, was not necessary to make a responsible decision.

QUESTIONS FROM SENATOR EVANS

QUESTION 9:	**Why does the Department consider having three different rock types to be such an overriding requirement, given the fact that the NRC recommendations on DOE site selection guidelines only require that you have one other geologic media in addition to salt?**
ANSWER:	At one time, prior to the passage of the Act, the NRC did have a requirement stating: "The Commission considers the characterization of three sites representing two geologic media at least one of which is not salt to be the minimum necessary to satisfy the requirements of NEPA." (10 CFR Part 51, February 25, 1981). The Act itself incorporated requirements making rock-type diversity an important consideration in selecting sites for characterization. NRC then revised its regulation in a Federal Register Notice of March 12, 1984, to bring it into conformance with the Act's requirements, which require diversity "to the extent practicable." Therefore, the NRC's minimum provision for diversity of rock type referenced in the question has been superceded by the Act's requirements. DOE does not consider diversity of rock types to be an "overriding requirement." Consideration of the potential benefits of diversity was certainly a factor in the decision, but it was not the only factor. Other considerations, such as the

excellent predicted postclosure performance of the Hanford site and the dominance of costs, were also important.

Although the arguments for diversity have traditionally been along the lines of avoiding common-mode failure during the postclosure period, we believe the potential advantages to be far broader in scope. For example, characterizing sites in diverse geologic environments increases the likelihood of being able to consider later in the siting process a wider range of repository-design alternatives and innovative ways to ensure compliance with regulatory requirements than would otherwise be possible. Examples are whether and when to backfill repository openings and ways to ensure that retrievability requirements can be met.

Finally, we note that diversity of rock type is a central theme of the siting provisions in the Act itself. The requirement in Section 112(a) to recommend sites in different media "to the extent practicable" was supported by all the major committees of jurisdiction in both the House and Senate, and approved by both houses separately before final approval of the Act.

QUESTIONS FROM SENATOR EVANS

QUESTION 10: **Is geologic diversity going to be a predominant factor for the second repository site portfolio recommendations as well?**

ANSWER: Since diversity is a central theme in the siting provisions in the Act (Sections 112(a) and 113(a)), is prudent, and has been part of the geologic repository program since its inception, we expect that it will be a factor in the second repository siting decisions as well. We cannot say now whether it will be a "predominant factor." The Act specifies other considerations, such as regionality, to also be important factors in the second round of repository siting decisions.

QUESTIONS FROM SENATOR EVANS

QUESTION 11: **Why did the Department omit the expected non-fatal injuries and genetic disorders from its assessment of health and safety impacts of repository construction and operation? In fact, when these figures are included in repository costs, doesn't the Hanford site drop out of the top three of the Department's recommended portfolio?**

ANSWER: Consideration was given to nonfatal health-and-safety effects in Section 4.6.4 of the final methodology report. As explained in the report, nonfatal health-and-safety effects would be expected to be highly correlated with fatal effects. If the nonfatal effects were included formally in the MUA, the result would be to give greater weight to the health-and-safety related objectives relative to the other objectives. Just such a sensitivity analysis is presented in Chapter 4 of the methodology report, where it is noted that the inclusion of such effects would not change the overall ranking of sites because of the overwhelming dominance of costs.

By the phrase "when these figures are included in repository costs," we assume that the reference is to the proposal to include such effects as costs since costs associated with worker health insurance premiums and the like are economic consequences. Such costs would be at most a few percent of the total repository costs. The total repository costs are a very uncertain basis for choice at this stage of the design process, and were not allowed to dominate the site-recommendation decision.

QUESTIONS FROM SENATOR EVANS

QUESTION 12: **Describe the factors which were considered in establishing a value scale for socioeconomic and environmental costs? Weren't these scales established after interviewing only four DOE managers? Haven't these rather arbitrarily assigned values actually determined the preclosure ranking of sites?**

ANSWER: The factors that were considered in establishing a value scale are described in Appendix G of the methodology report (pgs. G-56 and G-57). Briefly, the methodology report explains that the judgments reflect the significance of the end points of the corresponding performance-measure scales. Admittedly, these judgments are difficult, controversial, and somewhat subjective. However, by making such judgments explicit, others can evaluate them and see whether their own judgments would lead to significantly different conclusions. Such explicitness is a major benefit of a formal methodology.

It is true that the tradeoffs of socioeconomic and environmental impacts were established after interviewing four senior DOE managers. DOE had and continues to have no misconceptions that the judgments of these individuals would necessarily be the same as the other stakeholders in the decision. DOE believes they are representative and illustrative. Accordingly, extensive sensitivity analyses were conducted to explore the implications of alternative judgments. The results of the sensitivity analysis did not affect the overall ranking obtained by the MUA because of the dominance of costs.

As explained above, DOE does not believe that the assigned values are arbitrary. After repository and transportation costs, the weights on the factors had a fairly strong influence on the preclosure ranking of the sites.

QUESTIONS FROM SENATOR EVANS

QUESTION 13: The Department's own siting guidelines rank transportation on the same level of importance as environmental and social impacts. What rationale does the Department have for selectively disregarding transportation costs vis-a-vis these other comparable factors?

ANSWER: We appreciate that this is a point of some confusion with regard to the methodology report and the recommendation report. The following paragraphs should clarify the DOE's position.

The fundamental problem is that it is impossible to translate the qualitative statements on relative importance in the guidelines directly into quantitative value tradeoffs required for the MUA. The weights in the MUA reflect two things: value tradeoffs and the ranges spanned by the performance measures.* The statements on relative importance in the guidelines were included without explicit consideration of the ranges of the various preclosure attributes. Rather they were included to reflect perceived general values of society.

An example should clarify the point. Suppose the range from best to worst on the transportation cost-scale was 2 billion dollars. Suppose further the range from best to worst on the repository-cost scale was 10 billion dollars. If the value tradeoff is that a transportation dollar is worth the same as a repository-facility dollar -- a judgme of relative importance -- then the weight for the reposito cost scale must be 5 times that of the transportation-cost scale. Because of the common mistake of asking which of several attributes is most important, independent of their ranges, the weights are known formally in MUA as "scaling constants" to convey their dependence on the range of the respective attributes.

If the qualitative statements in the guidelines were forced improperly into the framework of MUA, the result would be indefensible value tradeoffs. For example, it is possible to interpret the qualitative statements on relative importance to require DOE to value avoiding one repository-worker radiological fatality more than one transportation-worker radiological fatality, or to value a dollar spent on waste transportation more than a dollar spent on repository construction and operation. The DOE did not and does not now think such value tradeoffs are reasonable in the current problem context, nor do we believe that the guidelines ever intended such tradeoffs to be made. In fact, language in the preamble to the guidelines suggests that the intent of the "relative importance" requirements had little or nothing to do with value tradeoffs among competing attributes but instead were threshold-type requirements to be considered in sequence. That is, primary attention or "importance" should be given to finding sites qualified under the postclosure guidelines because the primary purpose of a geologic repository is to provide long-term isolation for radioactive waste in a manner that protects the health and safety of the public. For the preclosure period, radiological safety has the highest importance because, unless it can be demonstrated to the satisfaction of the NRC that the repository will meet its worker and public exposure standards, the repository cannot be built. We note that this sequential approach was indirectly suggested by the BRWM/NAS in its letter of April 26, 1985, to Mr. Rusche: "The post-closure guidelines are clearly the most important and the adequacy of a site under the postclosure guidelines must be clearly established before attempting comparison with other sites. Deficiencies in the pre-closure factors can be mitigated substantially at increased cost."

Thus the DOE has satisfied the intent of the guidelines within the framework of the MUA by using the statements on relative importance qualitatively -- as philosophical guidance -- in making value tradeoffs among the various preclosure attributes. As indicated previously, this approach was fully endorsed by the BRWM/NAS and by another outside reviewer of the methodology (see letter from M.R. Sampson and R. Jim, Yakima Indian Nation, to Mr. Rusche, dated December 20, 1985).

In addition to the technical argument outlined above, we note that the preclosure system guidelines can readily be interpreted to mean that all costs, including transportation costs, be relegated to the third preclosure guideline grouping and be assigned "least importance." This interpretation may be based on a comparison of the system guideline on environment, socioeconomics, and transportation with the system guideline on ease and cost of siting, construction, operation and closure:

> (2) Environment, Socioeconomics, and Transportation. During repository siting, construction, operation, closure, and decommissioning *the public* and the *environment* shall be adequately protected from the *hazards* posed by the disposal of radioactive waste. [Emphasis added.]
>
> (3) Ease and Cost of Siting, Construction, Operation and Closure. Repository siting, construction, *operation*, and closure shall be demonstrated to be technically feasible on the basis of reasonably available technology, and the *associated costs* shall be demonstrated to be reasonable relative to other available and *comparable siting* options. [Emphasis added.]

It is clear that system guideline (2) emphasizes the health and safety of the public, not costs. System guideline (3) require consideration of "associated costs" incurred during "operation," which we believe would reasonably include transportation costs. Since system guidelines take precedence over technical guidelines in the siting-guidelines hierarchy and since the reference to transportation cost is limited to a single favorable condition under the technical guideline on transportation, we believe treating transportation costs as if it were in the third (least important) preclosure grouping is appropriate.

In summary, the location of transportation costs within the siting guidelines hierarchy is largely irrelevant for the MUA. The language in the siting guidelines allows flexibility to consider such costs as "least important." Treating transportation costs the same as repository-facility costs in the MUA was fully consistent with the point made by DOE in the preamble to the guidelines:

> Transportation-related costs, including access-route construction, will be included in the total system cost for comparison with the costs of other siting options.
> (Federal Register, Vol. 49, No. 236, Dec. 6, 1984, p. 47748.)

QUESTIONS FROM SENATOR EVANS

QUESTION 14: Construction of a repository at the Hanford site is estimated to cost approximately $14 billion. Costs at the four other sites under consideration were estimated at $8-$11 billion. What is the Department's rationale for disregarding such cost differentials?

ANSWER: The available evidence clearly indicates that DOE disregarded no siting factors in making the site-recommendation decision. To the contrary, the Secretary considered the full range of results and insights derived from the application of the methodology, one of which was that costs dominated whenever individual factors were aggregated. The result that costs would so completely dominate the overall rankings of sites was initially surprising and, frankly, somewhat unsettling as these costs must be regarded as very preliminary, at best. This point deserves some elaboration.

The cost estimates assumed in the methodology report are based on the current report on the total-system life-cycle costs. Although this was the best information available at the time, these estimates were considered more indicative than substantive because they are based on preconceptual repository designs. Moreover, these preconceptual designs are for a first-of-its-kind engineering project. These factors suggest a high potential for major design changes, with concomitant shifts in cost estimates. For example, cost estimates for the salt sites have assumed contemporaneous waste emplacement and backfill, thereby shortening by many years the repository-operations period relative to the Hanford site. (The long operations period assumed for the Hanford site is a significant contributor to its undiscounted cost.) If such an assumption were disallowed by the NEC, the cost estimates for the salt sites would increase significantly, perhaps even above those for Hanford. Very recent cost information still under review in OCRWM confirms the potential for major swings (upwards of a billion dollars) in repository costs.

Such basic and unpredictable system-design factors as these led the Secretary to temper consideration of costs with other considerations. Discomfort over the dominant effect of costs on the MUA results was apparently shared by the BRWM/NAS. In their letter of April 10, 1986, to the Director, OCRWM, they stated:

> On the basis of the Board's review of the application to a single site, it appears that the expected total repository and transportation cost will have a major, if not controlling, effect on the rankings under pre-closure factors. This recognition of the heavy dependence on cost reinforces the Board's judgment that the principal usefulness of the multiattribute utility method is to illuminate the factors involved in decision, rather than to make the decision itself. [Emphasis added.]

QUESTIONS FROM SENATOR EVANS

QUESTION 15: In the final version of the MUA, what was the weighting given to postclosure performance in terms of the composite score for each site? How does the Department justify this figure given the fact that in the Department's internal review, the comment was made that the .57 figure seemed "contrived"?

ANSWER: The DOE assigned no particular weight to postclosure performance in the MUA. Rather, a complete sensitivity analysis over the entire range of values was performed. In the methodology report, the 0.57 figure is simply a point at which the lines representing the composite utilities of the Hanford and Richton Dome sites cross under one particular set of assumptions. Since this figure is not used as the basis for the decision, there is no need to justify its use.

QUESTIONS FROM SENATOR EVANS

QUESTION 16:	During DOE's internal review of the MUA, a list of shortcomings in the document was prepared. Did the Department respond to these shortcomings? If so, in what manner? If not, why?
ANSWER:	The shortcomings referenced here are with regard to the personal comments of one reviewer on a working draft of the recommendation report. These concerns were considered in the development of other working drafts of the recommendation report.

QUESTIONS FROM SENATOR EVANS

QUESTION 17: Many of my questions are based on a report prepared by the House Subcommittee on General Oversight, Northwest Power, and Forest Management, and the Subcomittee on Energy Conservation and Power. The study raises numerous questions regarding the selection of the three sites for characterization. Is it the Department's intention to formally respond to this report? If so, when do you anticipate that you will release the response?

ANSWER: The Department formally responded to the referenced draft Subcommittee report in a letter dated February 18, 1987, from Mr. Rusche to Congressmen Markey, Swift and Wyden. A copy of that response, along with the incoming letter from the Congressmen, is attached.

Department of Energy
Washington, DC 20585

FEB 18 1987

Honorable Edward J. Markey
House of Representatives
Washington, D.C. 20515

Dear Mr. Markey:

We have carefully reviewed your letter of October 20, 1986, and the accompanying staff memorandum entitled "Preliminary Results of Staff Investigation into DOE's Selection of Three Sites for Characterization as the Nation's First Repository for High-Level Radioactive Waste." While we appreciate your interest in understanding and analyzing the decision process, we are dismayed by the comments made in these documents. After careful analysis, we conclude that, almost without exception, the findings of your staff's investigation are without basis.

The enclosed paper presents a point-by-point response to the principal points made in your letter and your staff's memorandum. I would like to summarize the principal conclusions here and attempt to clarify the role of the multiattribute utility analysis (MUA) in our decision since there is a consistent misinterpretation of its role in the staff memorandum.

Perhaps most important, we believe that you have not presented any credible evidence to substantiate criticisms that the Department of Energy (DOE) distorted and manipulated the MUA to produce a desired result--because none exists. No technical results whatever of that analysis were changed to promote or downgrade any site. Furthermore, state-of-the-art techniques were used to minimize the potential for conscious or unconscious biases to affect the results, and the Board on Radioactive Waste Management of the National Academy of Sciences (BRWM/NAS) stated that they found no evidence of bias in DOE's implementation of the methodology.

With respect to the comment that DOE edited the methodology and recommendation reports to suppress information unfavorable to the Hanford site or to the Deaf Smith site, we believe that the best measure of DOE's actions is not what passages were deleted from drafts during editing, but rather what passages remained in the final published reports. Our review of the language you indicate was removed from early drafts shows that in most cases language very similar in substance -- in some cases verbatim language -- was retained in the final reports. The remaining deletions were made for legitimate editorial reasons, most often to eliminate redundancies. Some deletions were also made to remove inappropriate judgments, for example, about which sites to characterize

or about the significance of differences among the sites, that overstepped the bounds of the decision-aiding role of the MUA. An excellent example of such an inappropriate judgment is found in the quote that appears at the top of page three of your letter of October 20.

Finally, we disagree that rock-type diversity was the sole basis for our selection of Hanford, and that we should have included that factor explicitly in the methodology. Diversity was clearly an important consideration. Indeed, the Nuclear Waste Policy Act of 1982 (the Act) itself requires DOE to recommend sites for characterization in different rock types "to the extent practicable," and diversity provides a number of important benefits, including insurance against the possibility of common-mode problems that could affect all sites in a given rock type. But diversity was not the only consideration. As the MUA indicates, Hanford is expected to have excellent postclosure performance, and the lowest adverse impacts on the community and environment in the vicinity of the site.

Because rock-type diversity is a property of portfolios of sites, while the MUA compared sites in terms of their individual characteristics, diversity could not have simply been "included in the methodology, so it could have been considered and weighted along with the other factors," as you suggest. A rigorous, formal evaluation of the effects of diversity would have required an additional, more complex form of analysis involving highly speculative judgments about such things as future licensing actions. Instead, we considered the portfolio effects qualitatively, as is commonly done in other portfolio-type problems. Such an approach is entirely consistent with the Act and the DOE siting guidelines.

In addition to responding to these specific comments, I would like to clarify a misunderstanding that permeates both your letter and your staff's analysis and that leads to many erroneous conclusions and inferences. This misunderstanding relates to the capability and role of the MUA in the decision process. That you view the MUA to be something that it is not is revealed by references in your letter to the MUA as a "more rigorous selection methodology," and in the statement that "DOE distorted and disregarded its own scientific analysis in order to support selection of the Hanford, Washington, site and to avoid selection of the Richton Dome, Mississippi, site." These statements indicate a belief that the MUA is capable of providing a "scientific" ranking of the five nominated sites -- a ranking somehow devoid of judgment -- which should then be used as the sole basis for selecting three for characterization. Without this fundamental premise, there are no logical grounds for criticizing DOE for not selecting the three top-ranked sites identified by the MUA, or for inferring that DOE "ignored" the

results of the MUA. Indeed, without that premise, there is no incentive for DOE to engage in all of the "manipulations" and "distortions" you believe were undertaken to promote Hanford into the top three sites.

This basic premise is false. The methodology was never intended or designed to make the decision about which sites to characterize, only to aid the responsible decision-maker, the Secretary of Energy, by providing insights about the advantages and disadvantages of the sites. There was no presumption that the three sites ranked highest by the MUA should be the three selected for characterization, and thus no need or incentive to manipulate the MUA to promote any supposedly favored site into the top three.

Limiting the role of the MUA in the decision process is appropriate for four important reasons. First, as attractive as it might be to shift the burden of decision to a "scientific decision methodology" (a phrase used in your staff memo to describe the MUA), no such methodology exists. As the BRWM/NAS stated in its review of the MUA, "there is no single, generally accepted procedure for integrating technical, economic, environmental, socioeconomic, and health and safety issues for ranking sites." The guidelines do not specify any particular method for ranking sites. Indeed, the idea of an "objective" numerical method for "computing" siting decisions was discussed and rejected in the final decision about the guidelines. We could find no support in the technical community for such a method and were unable to determine a framework that would be sufficiently complete to eliminate the exercise of judgment on the part of Federal officials who make the siting decisions. In its April 2, 1984, letters to DOE and the NRC concerning the draft siting guidelines, the BRWM/NAS said: "The combination of complexity and uncertainty [in the repository siting problem] implies that DOE must be accorded substantial discretion to exercise its best technical judgments in recommending three of the nominated sites. . . ."

Second, the MUA, like any such methodology, involves the simplification of a complex reality. It is capable of providing only a partial and approximate accounting of the many factors important to the site-recommendation decision. Basing siting decisions solely on the numerical results of an unavoidably limited formal analysis would be improper. These are decisions about real sites that affect unique communities and people, not about mathematical abstractions. No amount of analysis would relieve DOE of the ultimate responsibility to make its decision based on consideration of the full range of data and information in the Environmental Assessments (EAs).

Third, the significance of the aggregate ranking produced by the methodology must be tempered by an appreciation of the relatively limited data available before characterization. For example, the cost estimates used in the MUA are based on current system designs that may change significantly as a result of the information gained during site characterization and of later decisions about the overall waste-management system (e.g., construction of an MRS). A geologic repository is a first-of-its-kind engineering task, and it is wise to be modest about our ability to predict the ultimate design that will emerge at the end of the licensing process (also a first-of-its-kind enterprise). The range of uncertainty on costs incorporated in the MUA does not include uncertainty about system design, only the types of uncertainties inherent in any large construction project with a given design. Uncertainties not accounted for in the MUA, such as the possibility of as-yet-unidentified factors, may ultimately overshadow current estimates of site differences.

Finally, any methodology for ranking sites based on their individual attributes would be unable to fully take account of the important factor of rock-type diversity, which is an attribute of sets of sites rather than of individual sites. As discussed earlier and in the enclosure to this letter, there is no a priori reason for concluding that the three sites that rank at the top when the sites are considered individually would make up the best set of three for characterization when diversity is taken into account. Thus there are no logical grounds for concluding that failure to select the top-ranked three sites is prima facie evidence of flawed decisionmaking.

In summary, because of the limitations of this or of any formal methodology that might be used to model the key factors in a decision problem, it is necessary to supplement the insights gained from the methodology with professional experience and judgment. That the methodology must be decision-aiding and not decision-making has been stressed by DOE from the beginning and was unequivocally endorsed by the BRWM/NAS in its review letters to DOE. Since the MUA was never intended or designed to make the decision, all of the criticisms based on the incorrect premise that it was, are unfounded.

Despite its limitations, the application of a formal methodology as part of the decision process provided a number of important advantages. Unlike the simpler methods used to rank the sites in the draft EAs, the MUA produced quantitative estimates of the performance of each site on each siting factor specified in the guidelines. Combining these estimates with the explicit value judgments required by the analysis gave valuable insights into the importance of the differences among the sites. For example, it showed that all of the sites are expected to release radioactive materials at levels that are very far below the levels allowed by EPA standards, and that the differences between the sites are not significant.

Furthermore, the MUA makes the process of analysis explicit and open to review. It clearly separates the technical judgments about the performance and impacts of a repository at the various sites from value judgments about the desirability of those possible impacts, and makes both types of judgments explicit. This makes it easy for readers to determine which judgments are important to the conclusions of the analysis and which are not, and allows them to test the implications of different value judgments and technical judgments. DOE does not expect that everyone will agree with all of the assumptions and judgments included in the analysis. However, DOE believes that it is very valuable to have those assumptions and judgments stated clearly and precisely, so that others can evaluate them and see whether their own judgments would lead to significantly different conclusions.

In conclusion, the responses we have provided here and in the enclosed paper demonstrate that all comments related to developing the MUA after having fixed immutably on a predetermined set of sites, as well as comments related to manipulation of results, are without foundation. We do not believe that the open and well-documented process by which DOE has approached the selection of sites for characterization should damage the credibility of the repository program. Quite the contrary, the fact that the Subcommittee staff was able to critically analyze the decision demonstrates the unprecedented openness of the decision process. For these reasons, we must reject your statement that the site-recommendation decision is "seriously flawed and totally unsupportable."

Further, we believe any additional analysis beyond what was done to support the May 28 decisions would not be cost-effective. We have seen nothing to indicate that application of a formal portfolio analysis would reveal important new insights that would warrant reconsideration of our decision. We believe that the best way to enhance credibility at this time is to get on with the important job of gathering detailed data about the three sites, as mandated by the Act, rather than to continue to analyze the limited data that are available before characterization.

I would welcome the opportunity to discuss these points with you further at your convenience.

Sincerely,

Ben C Rusche

Ben C. Rusche, Director
Office of Civilian Radioactive
Waste Management

Enclosure

Department of Energy
Washington, DC 20585

FEB 18 1987

Honorable Ron Wyden
House of Representatives
Washington, D.C. 20515

Dear Mr. Wyden:

We have carefully reviewed your letter of October 20, 1986, and the accompanying staff memorandum entitled "Preliminary Results of Staff Investigation into DOE's Selection of Three Sites for Characterization as the Nation's First Repository for High-Level Radioactive Waste." While we appreciate your interest in understanding and analyzing the decision process, we are dismayed by the comments made in these documents. After careful analysis, we conclude that, almost without exception, the findings of your staff's investigation are without basis.

The enclosed paper presents a point-by-point response to the principal points made in your letter and your staff's memorandum. I would like to summarize the principal conclusions here and attempt to clarify the role of the multiattribute utility analysis (MUA) in our decision since there is a consistent misinterpretation of its role in the staff memorandum.

Perhaps most important, we believe that you have not presented any credible evidence to substantiate criticisms that the Department of Energy (DOE) distorted and manipulated the MUA to produce a desired result--because none exists. No technical results whatever of that analysis were changed to promote or downgrade any site. Furthermore, state-of-the-art techniques were used to minimize the potential for conscious or unconscious biases to affect the results, and the Board on Radioactive Waste Management of the National Academy of Sciences (BRWM/NAS) stated that they found no evidence of bias in DOE's implementation of the methodology.

With respect to the comment that DOE edited the methodology and recommendation reports to suppress information unfavorable to the Hanford site or to the Deaf Smith site, we believe that the best measure of DOE's actions is not what passages were deleted from drafts during editing, but rather what passages remained in the final published reports. Our review of the language you indicate was removed from early drafts shows that in most cases language very similar in substance -- in some cases verbatim language -- was retained in the final reports. The remaining deletions were made for legitimate editorial reasons, most often to eliminate redundancies. Some deletions were also made to remove inappropriate judgments, for example, about which sites to characterize

or about the significance of differences among the sites, that overstepped the bounds of the decision-aiding role of the MUA. An excellent example of such an inappropriate judgment is found in the quote that appears at the top of page three of your letter of October 20.

Finally, we disagree that rock-type diversity was the sole basis for our selection of Hanford, and that we should have included that factor explicitly in the methodology. Diversity was clearly an important consideration. Indeed, the Nuclear Waste Policy Act of 1982 (the Act) itself requires DOE to recommend sites for characterization in different rock types "to the extent practicable," and diversity provides a number of important benefits, including insurance against the possibility of common-mode problems that could affect all sites in a given rock type. But diversity was not the only consideration. As the MUA indicates, Hanford is expected to have excellent postclosure performance, and the lowest adverse impacts on the community and environment in the vicinity of the site.

Because rock-type diversity is a property of portfolios of sites, while the MUA compared sites in terms of their individual characteristics, diversity could not have simply been "included in the methodology, so it could have been considered and weighted along with the other factors," as you suggest. A rigorous, formal evaluation of the effects of diversity would have required an additional, more complex form of analysis involving highly speculative judgments about such things as future licensing actions. Instead, we considered the portfolio effects qualitatively, as is commonly done in other portfolio-type problems. Such an approach is entirely consistent with the Act and the DOE siting guidelines.

In addition to responding to these specific comments, I would like to clarify a misunderstanding that permeates both your letter and your staff's analysis and that leads to many erroneous conclusions and inferences. This misunderstanding relates to the capability and role of the MUA in the decision process. That you view the MUA to be something that it is not is revealed by references in your letter to the MUA as a "more rigorous selection methodology," and in the statement that "DOE distorted and disregarded its own scientific analysis in order to support selection of the Hanford, Washington, site and to avoid selection of the Richton Dome, Mississippi, site." These statements indicate a belief that the MUA is capable of providing a "scientific" ranking of the five nominated sites -- a ranking somehow devoid of judgment -- which should then be used as the sole basis for selecting three for characterization. Without this fundamental premise, there are no logical grounds for criticizing DOE for not selecting the three top-ranked sites identified by the MUA, or for inferring that DOE "ignored" the

results of the MUA. Indeed, without that premise, there is no incentive for DOE to engage in all of the "manipulations" and "distortions" you believe were undertaken to promote Hanford into the top three sites.

This basic premise is false. The methodology was never intended or designed to make the decision about which sites to characterize, only to aid the responsible decision-maker, the Secretary of Energy, by providing insights about the advantages and disadvantages of the sites. There was no presumption that the three sites ranked highest by the MUA should be the three selected for characterization, and thus no need or incentive to manipulate the MUA to promote any supposedly favored site into the top three.

Limiting the role of the MUA in the decision process is appropriate for four important reasons. First, as attractive as it might be to shift the burden of decision to a "scientific decision methodology" (a phrase used in your staff memo to describe the MUA), no such methodology exists. As the BRWM/NAS stated in its review of the MUA, "there is no single, generally accepted procedure for integrating technical, economic, environmental, socioeconomic, and health and safety issues for ranking sites." The guidelines do not specify any particular method for ranking sites. Indeed, the idea of an "objective" numerical method for "computing" siting decisions was discussed and rejected in the final decision about the guidelines. We could find no support in the technical community for such a method and were unable to determine a framework that would be sufficiently complete to eliminate the exercise of judgment on the part of Federal officials who make the siting decisions. In its April 2, 1984, letters to DOE and the NRC concerning the draft siting guidelines, the BRWM/NAS said: "The combination of complexity and uncertainty [in the repository siting problem] implies that DOE must be accorded substantial discretion to exercise its best technical judgments in recommending three of the nominated sites. . . ."

Second, the MUA, like any such methodology, involves the simplification of a complex reality. It is capable of providing only a partial and approximate accounting of the many factors important to the site-recommendation decision. Basing siting decisions solely on the numerical results of an unavoidably limited formal analysis would be improper. These are decisions about real sites that affect unique communities and people, not about mathematical abstractions. No amount of analysis would relieve DOE of the ultimate responsibility to make its decision based on consideration of the full range of data and information in the Environmental Assessments (EAs).

Third, the significance of the aggregate ranking produced by the methodology must be tempered by an appreciation of the relatively limited data available before characterization. For example, the cost estimates used in the MUA are based on current system designs that may change significantly as a result of the information gained during site characterization and of later decisions about the overall waste-management system (e.g., construction of an MRS). A geologic repository is a first-of-its-kind engineering task, and it is wise to be modest about our ability to predict the ultimate design that will emerge at the end of the licensing process (also a first-of-its-kind enterprise). The range of uncertainty on costs incorporated in the MUA does not include uncertainty about system design, only the types of uncertainties inherent in any large construction project with a given design. Uncertainties not accounted for in the MUA, such as the possibility of as-yet-unidentified factors, may ultimately overshadow current estimates of site differences.

Finally, any methodology for ranking sites based on their individual attributes would be unable to fully take account of the important factor of rock-type diversity, which is an attribute of sets of sites rather than of individual sites. As discussed earlier and in the enclosure to this letter, there is no _a priori_ reason for concluding that the three sites that rank at the top when the sites are considered individually would make up the best set of three for characterization when diversity is taken into account. Thus there are no logical grounds for concluding that failure to select the top-ranked three sites is _prima facie_ evidence of flawed decisionmaking.

In summary, because of the limitations of this or of any formal methodology that might be used to model the key factors in a decision problem, it is necessary to supplement the insights gained from the methodology with professional experience and judgment. That the methodology must be decision-aiding and not decision-making has been stressed by DOE from the beginning and was unequivocally endorsed by the BRWM/NAS in its review letters to DOE. Since the MUA was never intended or designed to make the decision, all of the criticisms based on the incorrect premise that it was, are unfounded.

Despite its limitations, the application of a formal methodology as part of the decision process provided a number of important advantages. Unlike the simpler methods used to rank the sites in the draft EAs, the MUA produced quantitative estimates of the performance of each site on each siting factor specified in the guidelines. Combining these estimates with the explicit value judgments required by the analysis gave valuable insights into the importance of the differences among the sites. For example, it showed that all of the sites are expected to release radioactive materials at levels that are very far below the levels allowed by EPA standards, and that the differences between the sites are not significant.

Furthermore, the MUA makes the process of analysis explicit and open to review. It clearly separates the technical judgments about the performance and impacts of a repository at the various sites from value judgments about the desirability of those possible impacts, and makes both types of judgments explicit. This makes it easy for readers to determine which judgments are important to the conclusions of the analysis and which are not, and allows them to test the implications of different value judgments and technical judgments. DOE does not expect that everyone will agree with all of the assumptions and judgments included in the analysis. However, DOE believes that it is very valuable to have those assumptions and judgments stated clearly and precisely, so that others can evaluate them and see whether their own judgments would lead to significantly different conclusions.

In conclusion, the responses we have provided here and in the enclosed paper demonstrate that all comments related to developing the MUA after having fixed immutably on a predetermined set of sites, as well as comments related to manipulation of results, are without foundation. We do not believe that the open and well-documented process by which DOE has approached the selection of sites for characterization should damage the credibility of the repository program. Quite the contrary, the fact that the Subcommittee staff was able to critically analyze the decision demonstrates the unprecedented openness of the decision process. For these reasons, we must reject your statement that the site-recommendation decision is "seriously flawed and totally unsupportable."

Further, we believe any additional analysis beyond what was done to support the May 28 decisions would not be cost-effective. We have seen nothing to indicate that application of a formal portfolio analysis would reveal important new insights that would warrant reconsideration of our decision. We believe that the best way to enhance credibility at this time is to get on with the important job of gathering detailed data about the three sites, as mandated by the Act, rather than to continue to analyze the limited data that are available before characterization.

I would welcome the opportunity to discuss these points with you further at your convenience.

Sincerely,

Ben C Rusche

Ben C. Rusche, Director
Office of Civilian Radioactive
Waste Management

Enclosure

Department of Energy
Washington, DC 20585

FEB 18 1987

Honorable Al Swift
House of Representatives
Washington, D.C. 20515

Dear Mr. Swift:

We have carefully reviewed your letter of October 20, 1986, and the accompanying staff memorandum entitled "Preliminary Results of Staff Investigation into DOE's Selection of Three Sites for Characterization as the Nation's First Repository for High-Level Radioactive Waste." While we appreciate your interest in understanding and analyzing the decision process, we are dismayed by the comments made in these documents. After careful analysis, we conclude that, almost without exception, the findings of your staff's investigation are without basis.

The enclosed paper presents a point-by-point response to the principal points made in your letter and your staff's memorandum. I would like to summarize the principal conclusions here and attempt to clarify the role of the multiattribute utility analysis (MUA) in our decision since there is a consistent misinterpretation of its role in the staff memorandum.

Perhaps most important, we believe that you have not presented any credible evidence to substantiate criticisms that the Department of Energy (DOE) distorted and manipulated the MUA to produce a desired result--because none exists. No technical results whatever of that analysis were changed to promote or downgrade any site. Furthermore, state-of-the-art techniques were used to minimize the potential for conscious or unconscious biases to affect the results, and the Board on Radioactive Waste Management of the National Academy of Sciences (BRWM/NAS) stated that they found no evidence of bias in DOE's implementation of the methodology.

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or about the significance of differences among the sites, that overstepped the bounds of the decision-aiding role of the MUA. An excellent example of such an inappropriate judgment is found in the quote that appears at the top of page three of your letter of October 20.

Finally, we disagree that rock-type diversity was the sole basis for our selection of Hanford, and that we should have included that factor explicitly in the methodology. Diversity was clearly an important consideration. Indeed, the Nuclear Waste Policy Act of 1982 (the Act) itself requires DOE to recommend sites for characterization in different rock types "to the extent practicable," and diversity provides a number of important benefits, including insurance against the possibility of common-mode problems that could affect all sites in a given rock type. But diversity was not the only consideration. As the MUA indicates, Hanford is expected to have excellent postclosure performance, and the lowest adverse impacts on the community and environment in the vicinity of the site.

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In addition to responding to these specific comments, I would like to clarify a misunderstanding that permeates both your letter and your staff's analysis and that leads to many erroneous conclusions and inferences. This misunderstanding relates to the capability and role of the MUA in the decision process. That you view the MUA to be something that it is not is revealed by references in your letter to the MUA as a "more rigorous selection methodology," and in the statement that "DOE distorted and disregarded its own scientific analysis in order to support selection of the Hanford, Washington, site and to avoid selection of the Richton Dome, Mississippi, site." These statements indicate a belief that the MUA is capable of providing a "scientific" ranking of the five nominated sites -- a ranking somehow devoid of judgment -- which should then be used as the sole basis for selecting three for characterization. Without this fundamental premise, there are no logical grounds for criticizing DOE for not selecting the three top-ranked sites identified by the MUA, or for inferring that DOE "ignored" the

results of the MUA. Indeed, without that premise, there is no incentive for DOE to engage in all of the "manipulations" and "distortions" you believe were undertaken to promote Hanford into the top three sites.

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In summary, because of the limitations of this or of any formal methodology that might be used to model the key factors in a decision problem, it is necessary to supplement the insights gained from the methodology with professional experience and judgment. That the methodology must be decision-aiding and not decision-making has been stressed by DOE from the beginning and was unequivocally endorsed by the BRWM/NAS in its review letters to DOE. Since the MUA was never intended or designed to make the decision, all of the criticisms based on the incorrect premise that it was, are unfounded.

Despite its limitations, the application of a formal methodology as part of the decision process provided a number of important advantages. Unlike the simpler methods used to rank the sites in the draft EAs, the MUA produced quantitative estimates of the performance of each site on each siting factor specified in the guidelines. Combining these estimates with the explicit value judgments required by the analysis gave valuable insights into the importance of the differences among the sites. For example, it showed that all of the sites are expected to release radioactive materials at levels that are very far below the levels allowed by EPA standards, and that the differences between the sites are not significant.

Furthermore, the MUA makes the process of analysis explicit and open to review. It clearly separates the technical judgments about the performance and impacts of a repository at the various sites from value judgments about the desirability of those possible impacts, and makes both types of judgments explicit. This makes it easy for readers to determine which judgments are important to the conclusions of the analysis and which are not, and allows them to test the implications of different value judgments and technical judgments. DOE does not expect that everyone will agree with all of the assumptions and judgments included in the analysis. However, DOE believes that it is very valuable to have those assumptions and judgments stated clearly and precisely, so that others can evaluate them and see whether their own judgments would lead to significantly different conclusions.

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Further, we believe any additional analysis beyond what was done to support the May 28 decisions would not be cost-effective. We have seen nothing to indicate that application of a formal portfolio analysis would reveal important new insights that would warrant reconsideration of our decision. We believe that the best way to enhance credibility at this time is to get on with the important job of gathering detailed data about the three sites, as mandated by the Act, rather than to continue to analyze the limited data that are available before characterization.

I would welcome the opportunity to discuss these points with you further at your convenience.

Sincerely,

Ben C Rusche

Ben C. Rusche, Director
Office of Civilian Radioactive
Waste Management

Enclosure

ENCLOSURE

Comment 1: DOE deliberately misled the Congress as to the existence of documents.

DOE did not deliberately mislead the Subcommittee on Energy Conservation and Power as to the existence of draft working documents of either the methodology report or the recommendation report. DOE did not retain working drafts in its general office files. Such a procedure is routine and consistent with DOE directives not to retain such materials. In some cases, working drafts of these documents were retained in the personal files of individuals intimately involved with writing or reviewing these documents. All retained documents, whether in official or personal files, were made readily available for the perusal of the Subcommittee staff and, for its convenience, were categorized and filed at one central location at DOE.

Comment 2: DOE systematically and deliberately distorted, suppressed, and manipulated its own scientific data and analysis in an effort to promote the Hanford site and to downgrade the Richton Dome site.

The statement that DOE systematically distorted and manipulated data, that is, technical and value judgments, in working drafts of the methodology report is false. No technical results whatsoever were changed to promote the Hanford site or downgrade the Richton Dome site or any site for that matter. To check this statement, the Subcommittee is invited to compare data contained in the March 17, 1986, submittal to the Board on Radioactive Waste Management of the National Academy of Sciences (BRWM/NAS) with data in the final methodology report. The estimates of preclosure impacts for the Richton Dome site, for example, are exactly the same in the two documents (cf. Table 4-9 in the March 17 submittal with Table 4-8 in the final methodology report).

The Subcommittee further contends that the fact that the preparation of the methodology and recommendation reports overlapped to some degree is evidence of wrongdoing. We disagree. The methodology report was in large measure complete -- certainly the major insights had been communicated to the Director, OCRWM -- by the time the first meeting discussing the need for the recommendation report was held on April 4, 1986. In any case, since the methodology was never intended or designed to make the decision, we do not regard the parallel preparation of the two documents as irregular.

Irrespective of the timing issue, the central question is whether, by deletions, DOE suppressed information about the estimated deficiencies of the Hanford site. We submit that a truer, more accurate measure of whether information was suppressed is not what passages were deleted during the routine editing process but rather what passages remained after that process. The following passages from the final methodology report demonstrate clearly that comments related to suppressing unfavorable information about any of the sites are unfounded.

> Pg. 3-43, first paragraph: "From the relative ranking of the sites and estimates of uncertainty, it appears that the postclosure performance of a repository at the Hanford site would be slightly less favorable than that of a repository at the salt sites or at the Yucca Mountain site."
>
> Pg. 4-36, fifth paragraph: ". . . The overall preclosure ranking is Yucca Mountain, Richton Dome, Deaf Smith, Davis Canyon, and Hanford. In terms of equivalent-consequence impacts, the difference between Yucca Mountain and Richton is the equivalent of 1119 million dollars, between Richton Dome and Deaf Smith 640 million dollars, between Deaf Smith and Davis Canyon 1127 million dollars, and between Davis Canyon and Hanford 2552 million dollars."
>
> Pg. 4-37, first paragraph: ". . . the relative [preclosure] ranking of sites obtained for the base case is totally insensitive to any changes in the level of impacts except for costs. Furthermore, the ranking is insensitive to any reasonable changes in the value judgments or in the form of the utility function."
>
> Pg. 5-4, third paragraph: ". . . certain patterns are clear and stable under a wide range of assumptions. The Hanford site is in all cases ranked fifth. . . ."
>
> Pg. 5-16, first paragraph: "This ranking [referring to the overall ranking of Yucca Mountain, Richton Dome, Deaf Smith, Davis Canyon, and Hanford] is stable except for the most extreme weightings of postclosure versus preclosure performance."

Other sentences stating estimated deficiences of the Hanford site appear in Chapters 3, 4, and 5 of the final methodology report.

On review of statements like those quoted above, Dr. Frank L. Parker, Chairman of the BRWM/NAS, in a letter to Congressman Weaver dated November 6, 1986, stated:

> "In view of these summary statements, I cannot possibly agree with Findings 5, 6, and 7 that state that the MUA was 'distorted,' 'flawed,' and 'contrived,' to place Hanford high in the list of sites to be characterized."

While it is true that during the course of developing the methodology report passages were both added and deleted from working drafts, these changes were appropriate because they were all directed at improving the quality of the report. As in any writing job, critical reviews of drafts by people other than the primary authors (i.e., others on the MUA team and DOE management) identified numerous opportunities for improving readability by clarifying, shuffling, reorganizing, and, in some instances, deleting text. Specifically, DOE deleted passages to eliminate: 1) redundancies, 2) unsupported or overstated conclusions, 3) inappropriate value-laden language, and 4) unnecessarily complex language. The fact that redundancies should be minimized needs no elaboration. The importance of the other criteria for deleting text and examples are discussed below.

The quote that appears at the top of page 3 of the Congressional letter of October 20 provides an example of an unsupported statement that appeared in working drafts of the methodology report. This paragraph was properly deleted because it could not be supported by the results of the MUA. Because the MUA compared the sites on an individual basis rather than as portfolios, it is not possible to conclude from it alone what set of three sites should be characterized. In addition, several statements in the deleted passage contained value-laden remarks, such as a conclusion that a difference was "substantial." Other examples of value-laden words that were generally deleted or modified are "significant" and "reasonable." We believed that value judgments about the significance of the results were best left to the Secretary as the decisionmaker and that such judgments should appear in the recommendation report, not in the MUA. In sum, this paragraph and similar deleted passages overstepped the bounds of the role of the decision-aiding methodology.

An example of unnecessarily complex language that was deleted appears on page\29 of the staff memorandum. The deleted passage appeared in the conclusions section of Chapter 4, the preclosure analysis of the sites, and concerned the probability for a significant correlation in total costs among the sites. The passage was deleted because it seemed out of place inasmuch as the section was intended as a summary of conclusions. This detailed, technical point had been covered earlier in the main text of the chapter.

In summary, the central contention of the Congressional letter and staff analysis is false. A cursory comparison of language in early drafts of the methodology report against the final report shows that, in most cases, verbatim language, or language very similar in substance, was retained. Deletions were made for proper and legitimate reasons. Such facts lend no credibility to the Subcommittee's comments related to tailoring the final methodology report to suit a predetermined choice of sites.

Comment 3: DOE biased weighting factors in the MUA to promote the selection of the Hanford site.

This comment is without foundation. In fact, great care was taken to safeguard against bias and manipulation of the methodology. First, by judicious selection of people, DOE ensured that no individual providing input to the methodology had any professional or economic incentives for the selection or rejection of a particular site. All judgmental inputs were the joint responsibility of many individuals, thereby diluting the influence of any single individual and creating a situation where individual bias would be apparent through comparisons across individuals. Second, care was taken to maintain separation between individuals making scientific judgments (e.g., probabilities of disruptive scenarios) and those making policy or value judgments (e.g., weighting factors). Such a division of labor is recommended by the National Academy of Sciences* and in the professional decision-analysis literature.

Third, formal state-of-the-art assessment techniques designed to minimize bias were used to obtain inputs to the methodology. These assessments were highly detailed and disaggregated, so much so that a computer was required to aggregate and analyze the implications of individual assessments. As a consequence, at the time at which the assessments were made, the implications for overall rankings were very difficult for the individuals providing the judgments to determine. Finally, all judgments were required to be supported by an explicit logic. Particularly controversial judgments, such as value tradeoffs between dollars and fatalities, were compared whenever possible with the values recommended for or implied by other Federal-agency decisions.

Thus, while it is true that an individual biased toward or against a site might have an idea how to alter any given judgment to manipulate results, the above safeguards would minimize the effect as follows:

- The requirement that all judgments be justified in terms of logic and information in the Environmental Assessments (EAs) limits the extent to which any input could be successfully biased.
- Due to the complexity of the MUA model it would be extremely difficult for a participant to know which of his inputs, if biased, would have an effect on conclusions.

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*National Research Council, 1983. Risk Assessment in the Federal Government: Managing the Process, Commission on Life Sciences, National Academy of Sciences, Washington, D.C.

- Due to the extensive opportunities for crosschecking to identify inconsistencies, any bias in judgments would have to be kept small to avoid making those biases obvious to other participants.

- Since any individual provided only a small fraction of the necessary inputs, that person's ability to influence conclusions would be small.

Finally, in further support of this position, we note that the BRWM/NAS said they saw no indication of bias in DOE's implementation of the methodology (see April 10, 1986, letter from F. Parker to B. Rusche).

Comment 4: DOE, in disregard of its own siting guidelines, arbitrarily disregarded siting factors such as total costs in an effort to promote the Hanford site.

The available evidence clearly indicates that DOE disregarded no siting factors in making the site-recommendation decision. To the contrary, the Secretary considered the full range of results and insights derived from the application of the methodology, one of which was that costs dominated whenever individual factors were aggregated. The result that costs would so completely dominate the overall rankings of sites was initially surprising and, frankly, somewhat unsettling as these costs must be regarded as very preliminary, at best. This point deserves some elaboration.

The cost estimates assumed in the methodology report are based on the current report on the total-system life-cycle costs. Although this was the best information available at the time, these estimates were considered more indicative than substantive because they are based on preconceptual repository designs. Moreover, these preconceptual designs are for a first-of-its-kind engineering project. These factors suggest a high potential for major design changes, with concomitant shifts in cost estimates. For example, cost estimates for the salt sites have assumed contemporaneous waste emplacement and backfill, thereby shortening by many years the repository-operations period relative to the Hanford site. (The long operations period assumed for the Hanford site is a significant contributor to its undiscounted cost.) If such an assumption were disallowed by the NRC, the cost estimates for the salt sites would increase significantly, perhaps even above those for Hanford. Very recent cost information still under review in OCRWM confirms the potential for major swings (upwards of a billion dollars) in repository costs.

Such basic and unpredictable system-design factors as these led the Secretary to temper consideration of costs with other considerations. Discomfort over the dominant effect of costs on the MUA results was apparently shared by the BRWM/NAS. In their letter of April 10, 1986, to the Director, OCRWM, they stated:

> "On the basis of the Board's review of the application to a single site, it appears that the expected total repository and transportation costs will have a major, if not controlling, effect on the rankings under pre-closure factors. This recognition of the heavy dependence on cost reinforces the Board's judgment that the principal usefulness of the multi-attribute utility method is to illuminate the factors involved in a decision, rather than to make the decision itself." [Emphasis added.]

Not only were all factors considered in making the decision, but they were accorded their proper weight consistent with provisions of the siting guidelines. The relative importance provisions in the siting guidelines are qualitative and reflect general perceived values of society. This is in contrast to the quantitative information required for the MUA. DOE gave operational meaning to the qualitative guidance by ensuring that value tradeoffs -- judgments of relative importance -- be consistent with a conservative philosophy in which costs are among the least important and public health and safety are most important. Such an approach is consistent with the guidance from the BRWM/NAS and from other independent reviewers of the methodology (see letter dated December 20, 1985, from M.R. Sampson and R.\Jim, Yakima Indian Nation, to B. Rusche).

In summary, all factors specified by the siting guidelines were considered by the Secretary in making the site-characterization decision. This position is supported by other outside reviewers of the methodology and recommendation reports (see pg. 2 of letter, dated November 6, 1986, from F. Parker to Congressman J. Weaver).

Comment 5: DOE deliberately did an incomplete multiattribute utility analysis for fear that a complete analysis would not support the selection of the Hanford site.

We discuss here two aspects of this comment: (a) the omission of explicit consideration of nonfatal health-and-safety impacts in the MUA, and (b) the decision not to perform an additional portfolio analysis to take into account rock-type diversity.

Consideration was given to nonfatal health-and-safety impacts in Section 4.6.4 of the methodology report. As explained in the report, the effect of including nonfatal impacts would be to give greater weight to the health-and-safety related objectives relative to the other objectives. Just such a sensitivity analysis is described in Chapter 4 of the methodology report (see Table 4-16), where it is argued that the inclusion of such impacts would not change the overall ranking of sites (although the spread between sites changes) because of the overwhelming dominance of costs.

With regard to the judgment not to perform the additional portfolio analysis needed to consider the effects of rock-type diversity, we acknowledge that such an analysis might possibly have provided additional insights about the relative desirability of portfolios of three sites. As in any formal siting study, decisions had to be made about what and what not to include in the formal analysis. It was our judgment that the extra time, cost, and effort necessary to perform a formal portfolio analysis was not required to make a responsible decision. A rigorous, formal evaluation of the effects of diversity would require a more complex form of analysis involving highly speculative judgments about such things as future licensing actions. Instead, we considered the portfolio effects qualitatively, as is commonly done in other portfolio-type problems. We believe such an approach is entirely consistent with the Act and the siting guidelines.

Professor Ralph L. Keeney, who participated in the development of the MUA, has on his own initiative recently conducted a partial portfolio analysis.* While we disagree with the conclusions and recommendations Professor Keeney derives from his new analysis, we believe it supports the long-standing principle that diversity should be an important factor in siting. Furthermore, we believe that the results of the analysis support our conclusion that a formal portfolio analysis would not yield major new insights that would lead to a different choice of sites.

Related to this point is the role diversity played in the decision to select Hanford for characterization. It is clear from the Congressional letter that this role was misunderstood. Consideration of the potential benefits of diversity was certainly a factor in the decision. Although the arguments for diversity have traditionally been along the lines of avoiding common-mode failure during the postclosure period, we believe the potential advantages to be far broader in scope. For example, characterizing sites in diverse geologic environments increases the likelihood of being able to consider later in the siting process a wider range of repository-design alternatives and innovative ways to ensure compliance with regulatory requirements than would otherwise be possible. Examples are whether and when to backfill repository openings and ways to ensure that retrievability requirements can be met.

However, diversity was not the only factor. The facts that there is no practical difference in the excellent predicted postclosure performance of the five sites and that the preclosure ranking is dominated by costs were also important. Diversity considerations confirmed that the set of three sites offered on balance the most advantageous combination of characteristics for successful development of repositories, as required by the siting guidelines.

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*R.L. Keeney, November 1986, "An Analysis of the Portfolio of Sites to Characterize for Selecting a Nuclear Repository," University of Southern California Decision Analysis Series.

Comment 6: DOE deliberately ignored advice from the Board on Radioactive Waste Management of the National Academy of Sciences in doing the multiattribute utility analysis and in making the site-recommendation decision.

We address here three parts to this comment: (a) DOE ignored the BRWM/NAS by allowing the siting guidelines to distort the weights accorded each siting factor; (b) DOE ignored the BRWM/NAS recommendations involving participation of outside experts; and (c) DOE ignored consideration of the relative vulnerability of the accessible environment at each site. DOE did not ignore these or any of the recommendations of the BRWM/NAS. Rather, DOE considered all recommendations very carefully, and, in fact, made many changes to the methodology and recommendation reports in response to these recommendations. It is true, however, that for various reasons, DOE decided not to follow all of the recommendations of the BRWM/NAS regarding the MUA, as explained below.

DOE did not allow the siting guidelines to distort the weights accorded siting factors in the MUA. The relative importance provisions in the siting guidelines were interpreted qualitatively, and were reflected in the analysis by ensuring that the quantitative value tradeoffs required by the MUA were consistent with a conservative philosophy that reflected general values of society. As discussed above, this did not involve eliminating costs from the analysis.

With regard to the merits of including outside experts in its implementation of the methodology, we recognize that the use of such people might have enhanced the credibility of the process. DOE decided not to directly involve outside experts in its implementation of the methodology for the following reasons:

1. DOE recognized from the outset the controversial nature of some of the judgments required as input to the methodology, for example, weighting factors. Accordingly, DOE performed numerous sensitivity analyses to examine how the site evaluations depended on the inputs to the model. These analyses roughly approximate differences in opinions and values of different groups and stakeholders interested in repository siting.

2. DOE staff and consultants were among the best qualified for providing the types of information required by the methodology. Further, DOE has the responsibility and the authority for making these judgments pursuant to the Act.

3. Other stakeholders have had several opportunities to influence the implementation of the methodology, albeit indirectly, by their involvement in the development of the siting guidelines and by reviews of the simple ranking methods presented in the draft EAs. Public-comment periods and rounds of consultation with interested parties on these documents did much to influence the specification of both the siting objectives and the value tradeoffs among objectives used in the methodology, which are the fundamental building blocks of the methodology.

4. Pursuant to requests from the public and the Congress, DOE did elicit an independent review of the methodology and its application from the BRWM/NAS. While this group said they were disappointed DOE did not involve outside experts, they also said they saw no indication of bias in DOE's implementation of the methodology.

In view of these factors, DOE did not directly involve all possible stakeholders. We believe this action balanced the requirements of the Act for State and public participation in the siting process against the requirements of the Act to continue to make timely progress toward repository development. Moreover, given the extensive sensitivity analyses, we doubt that the involvement of outside experts would have provided fresh insights into the MUA.

The last part of the comment concerns the idea that DOE should have considered the relative vulnerability of the accessible environment at the various sites. The concept of setting regulatory limits for releases of radioactivity to a universally applied accessible environment rather than for the predicted consequences of those releases is fundamental to the final Environmental Protection Agency's rule for disposal of nuclear waste. This rule was the subject of frequent interactions with the public and with independent scientific groups, including the BRWM/NAS, and took almost nine years to develop. A study* published in April 1983 by a special panel of the BRWM was critical of the radiation-release limits approach of the then-proposed EPA rule; the panel advocated instead an individual-dose limits approach. Although the EPA eventually added an individual-dose limit to its now-final rule, the release-limits approach is still the mainstay of the rule. EPA's rationale for emphasizing estimates of amounts of radioactivity released rather than individual exposures is that it avoids highly speculative predictions of future environmental pathways, behavioral patterns, and population distributions that determine how releases result in doses received by people. Such an approach will make demonstrations of compliance with the standards more straightforward. DOE as well as a special Science Advisory Board to the EPA generally agreed with these technical aspects of the standards.

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*National Research Council, 1983. A Study of the Isolation System for Geologic Disposal of Radioactive Wastes. Report of the Waste Isolation Systems Panel, Board on Radioactive Waste Management, Commission on Physical Sciences, Mathematics, and Resources, National Academy of Sciences, Washington, D.C.

Consistent with past DOE positions and with these regulations, DOE adopted a postclosure performance measure based on releases, not health effects. Not surprisingly, the BRWM/NAS disagreed with the measure, as it is the same as the EPA's. While the BRWM/NAS understood the DOE's position on this difficult issue, it advised that by ignoring current differences in accessible environments the DOE was ignoring a potentially important site discriminator. DOE agreed to consider differences in accessible environments only so far as such consideration was consistent with the EPA rule, and to do so in the final recommendation report.

Accordingly, DOE reviewed estimates of releases to the accessible environments at the various sites and observed that such releases are not expected to discharge to the Earth's surface or to surface-water bodies during the next several thousand years (see pg. 4 of recommendation report). Thus, differences in accessible environments among the sites are not discriminating.

Comment 7: DOE deliberately ignored other information, outside of the multiattribute utility analysis, potentially damaging to the Hanford site.

Early in the process of documenting the methodology, DOE considered whether to include "other information," for example, risk of disqualification, in what became the methodology report. Before the decision regarding the inclusion of this information was made, rough drafts of this "other information" section, written by DOE consultants, were circulated to a few DOE people for review. On review of these materials, it became clear that all factors identified as "other information" had already been or were being addressed adequately in the EAs, the methodology report, or the recommendation report. Therefore, to avoid double-counting, these other factors were not considered again in a separate chapter.

U.S. DEPARTMENT OF ENERGY
CORRESPONDENCE CONTROL FORM
OFFICE OF THE EXECUTIVE SECRETARY

TIVITY CHANGE DO NOT DETACH FROM ORIGINAL CORRESPONDENCE 15:32
JRCE CODE CC CONGRESSIONAL
PEC INT:
CONTROL NO: ES86-015843
E CORR: 10/20/86 DATE RECD: 10/20/86 DATE CNTRL: 10/21/86 DATE DUE: 11/18/86
ER: X MEMO: _ TWX: _ OTHER: _____ TO: SECY: X DEP SEC: _ UN SEC: _ OTHER: _____

O-MULTI 04

NUCLEAR
WASTE
REQUESTS DOE RESPOND TO ISSUES IN LETTER REGARDING WASTE PROGRAM INCLUDING SCHEDULE FOR REEVALUATING FIVE SITES

REMARKS: THIS IS A HIGH PRIORITY ITEM. DUE DATE MUST BE MET. MA-293 WILL OBTAIN CONCURRENCES. FINAL RESPONSE OR INTERIM MUST REACH THE EXECUTIVE SECRETARIAT BY THE DUE DATE.

FOR USE BY ACTION OFFICE ONLY

	ACTION REFERRED TO	DATE	RETURN TO	DUE DATE
1				
2				
3				

TION TO: RW TYPE ACTION: Prepare final reply SIG OF: S
JRRENCE: CP/1 GC/1 EH/1
RMATION: S DS US OS/GRAY CP/30 MA/29 DO/4
ILE CODE: CCMULTI-ES86015843 CONTROL ANALYST: Maria Brown....5075

ALL DOCUMENTS FOR OSE PRINCIPALS
MUST BE FORWARDED TO EXX FOR FINAL PROCESSING
MA-293

'86

FROM: O-MULTI 04
CONGRESSMEN, MARKEY
SWIFT, WEAVER, WYDEN

TO: THE SECRETARY

ORIG. DATE: 10/20/86
REC'D DATE: 10/21/86
DUE DATE: 11/14/86
COMP DATE:
ROUTE SYM: RW20

ACTIVITY: A CONTROL NO.: NW65620
SOURCE DOC.: LTR SOURCE CODE: DC
FILE CODE:
BY WHOM:
SPEC. INT: ES86-015843 CC

SUBJECT: NV-TX-WA-FIRST REPOSITORY
PERMANENT WASTE REPOSITORY
OPPOSES AS A WASTE SITE

ENCLOSURES**CONC. REQUIREMENTS***
RW-40, CP-1, GC-1, EH-1

TYPE OF ACTION: PREPARE FINAL REPLY
FOR SIGNATURE OF: S-1

REMARKS:

	REFERRED TO:	REF. DATE:	FOR
(1)	KALE	10/21/86	ACTN
(2)	DIRECTOR'S OFC.	10/21/86	INFO
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U.S. DEPARTMENT OF ENERGY
PENDING ACTION CONTROL

Congress of the United States
House of Representatives
Washington, D.C. 20515

October 20, 1986

The Honorable John S. Herrington
Secretary
U.S. Department of Energy
1000 Independence Avenue, S.W.
Washington, D.C. 20555

Dear Secretary Herrington:

On May 28, 1986, you recommended three sites in the western United States to be characterized for possible use as the nation's first high-level radioactive waste repository. The sites recommended are located in the States of Nevada, Texas and Washington. The two sites which were rejected are located in Mississippi and Utah.

The decision to select a permanent waste repository must be based on the soundest scientific and technical judgments possible. Yet we have found conclusive evidence, in many cases supplied by DOE's own internal documents, which lead us to only one possible conclusion: DOE distorted and disregarded its own scientific analysis in order to support selection of the Hanford, Washington site and to avoid selection of the Richton Dome, Mississippi site.

DOE documents obtained by the Subcommittee on Energy Conservation and Power, and the Subcommittee on General Oversight, Northwest Power, and Forest Management, reveal that DOE systematically deleted unfavorable information concerning the desirability of the Hanford, Washington and the Deaf Smith County, Texas sites. It is clear that the initial DOE draft documents told it like it is, and subsequent drafts told it like DOE wanted it to be.

Furthermore, it appears that DOE manipulated data, weighting factors and analytic techniques to arrive at a predetermined set of sites. In addition, DOE ignored findings and recommendations or its own technical staff and the National Academy of Sciences (NAS) and misconstrued the Nuclear Waste Policy Act.

It is also evident from this investigation that DOE misled the Subcommittee on Energy Conservation and Power as to the existence of DOE documents. You informed the Subcommittee on July 8, 1986, that all drafts of the recommendation report were routinely destroyed; however, numerous drafts of the report were discovered in DOE files during the course of this investigation.

Before reviewing in more detail the contents of the draft DOE documents, and the initial findings of our investigation, we believe a brief summary of events leading to this point are in order.

In December 1984, DOE issued draft environmental assessments which tentatively selected the Yucca Mountain, Nevada, the Deaf Smith County, Texas, and the Hanford, Washington sites for characterization. However, the selection methodologies which led to that final order were severely criticized by the NAS's Board on Radioactive Waste Management and others, and as a result, DOE went back to the drawing board to find a new and defensible methodology.

On April 10, 1986, the NAS finished its review of the new methodology and draft chapters of the Methodology Report which described DOE's implementation of the methodology. Through April and May, however, DOE continued to edit chapters from the Methodology Report. These chapters were materially and substantially changed during this period following the NAS review. In early May, DOE finalized the Methodology Report and in late May, the Recommendation Report was completed.

In response to your recommendation announcement on May 28, 1986, our Subcommittees embarked on an investigation of the decision process which led you to recommend the final three sites. The most immediate focus of the investigation was to determine why the site placing fifth and last in the metholodology, the Hanford site, was chosen as one of the three finalists; and why the very same three finalist sites which you recommended in your seriously flawed and discredited December, 1984, draft environmental assessments, were once again chosen by DOE in 1986, despite the contrary results of the new and more rigorous selection methodology.

As you know, the methodology report was supposed to present the unbiased and unadulterated evaluation of the five sites under the new methodology. We find it totally indefensible that this report was edited and manipulated to support the final recommendation decision. A review of internal DOE documents strongly suggests that DOE had decided on the three sites prior to completion of the methodology report, and then tailored the methodology report to justify the final decision. This contention is further supported by the fact that both the methodology and the recommedation reports were edited at the same time, by the same individuals at DOE. Thus, the methodology report which DOE claimed was "decision-aiding" turned out to be quite the opposite. It was in fact "decision-aided" since DOE was altering this report to support the final recommendation decision.

Specifically, DOE suppressed information which clearly established the undesirability of the Hanford, Washington site and the relative desirability of the Richton Dome, Mississippi site over the Deaf Smith County, Texas site. For instance, early drafts of chapter five of the methodology document concluded that the Hanford site should not be chosen for site characterization:

> "[I]t can be definitively stated that the results of the composite analysis strongly suggest characterization of the Yucca Mountain, Richton Dome, and Deaf Smith sites....There are no realistic assumptions about either preclosure or postclosure expected performance or about the value used to evaluate performance that can result in Hanford being anything but the last ranked site." (emphasis added.)

This passage was deleted in the final version.

Furthermore, statements from this chapter which supported the choice of the Richton Dome, Mississippi site over the Deaf Smith County, Texas site were also deleted from the final analysis:

> "For all assumptions about postclosure conditions and [a] wide range assumed to be realistic for weights...the relative ranking of the salt sites is stable; namely Richton Dome is preferred to Deaf Smith which is preferred to Davis Canyon."

But DOE did not stop at deleting just unfavorable phrases and passages from this final document. Unbelievably, in one case, an entire chapter disappeared. Drafts of this deleted chapter were discovered in DOE's files. Entitled "Other Information," or "Other Considerations," this chapter evaluated additional factors outside the scope of the multiattribute utility analysis which were "relevant to the site recommendation decision." One part of the chapter identified disqualifying conditions for each of the sites where "there is a reasonable likelihood that extremely poor site conditions could result in a small, but significant, probability of disqualification...." of a site. The DOE reached the following conclusion concerning this analysis:

> "Based on this review of disqualifying conditions, the Davis Canyon site and the Hanford site appear to be the least favorable sites. The Deaf Smith County site and the Richton Dome sites appear to be the most favorable sites; and the Yucca Mountain site should fall between these two groupings."

The recommendation report also went through many drafts and iterations. An examination of such drafts indicate that critical passages and phrases were also deleted from this document. For example the following passages were deleted from the final version of the recommendation report:

> "The initial order of preference, from the most-preferred to least preferred, is the Yucca Mountain site, the Richton Dome site, the Deaf Smith County site, the Davis Canyon site, and the Hanford site. Sensitivity analyses show that this initial order of preferenece is unchanged for a wide range of weights or scaling factors relating postclosure and preclosure impacts."

> "The results of sensitivity analyses strongly suggest that sites with lower expected postclosure utilities also tend to have greater uncertainties in postclosure performance. This range of uncertainty indicates little opportunity for the sites to improve, based on the results of site characterization studies, beyond the best-estimate values. However, there is considerable opportunity, especially for the non-salt sites, to retrogress, based on the results of site characterization studies, below the best-estimate values." (emphasis added.)

In addition to the deletion of unfavorable passages in both the methodology and recommendation reports, DOE manipulated its site selection analysis in order to place Hanford among the top three sites and to choose the Deaf Smith County site over the Richton Dome site. DOE accomplished this task by taking several highly questionable steps. These steps are detailed in the attached staff memorandum.

In the final analysis, DOE based its decision to select the Hanford site on rock diversity considerations. Since only three rock types were under consideration to begin with, the application of this final criteria guaranteed that the only basalt site, Hanford, and the only tuff site, Yucca Mountain, would be chosen. The only task remaining was to choose among the salt sites.

Since the rock type diversity criteria was so important, it should have been included in the methodology, so it could have been considered and weighted along with the other factors. It is apparent that rock type diversity could very well have been included in the methodology, but DOE refused to allow the eight weeks necessary to include it in the formal multiattribute utility analysis. It is simply incomprehensible that one of the most important factors, in effect the one overriding factor which made the final decision for DOE, was deliberately left out of the analysis.

The Subcommittees' analysis of the flawed nature of the DOE decision process is further supported by comments from the scientific community. A decision analyst, Detlof von Winterfeldt, who participated in the National Academy of Sciences review of the

The Honorable John S. Herrington
Page 5
October 20, 1986

DOE's application of the multiattribute utility analysis criticized the DOE's use of the results of such analysis to reach the selection of the final three sites. Professor von Winterfeldt expressed his objections in a letter to the Director of the DOE's nuclear waste program on July 22, 1986:

> "In brief, I believe that the conclusions drawn in the Recommendation Report are based on selective and misleading use of the analysis described in the Methodology Report....I find a convincing analysis that clearly rejects the Hanford site and, furthermore, supports the selection of the Richton Dome site over the Deaf Smith site....The most important conclusion that I draw from the Recommendation Report's inclusion of the Hanford and Deaf Smith sites is that DOE is apparently willing to accept more health effects and an additional cost of $3.360 Billion in return for several minor advantages of the two sites. As a decision analyst, I find these implications inconsistent with the Methodology Report. As a concerned member of the public and a taxpayer, I find them irresponsible."

In conclusion, we believe it is painfully evident that DOE's recommendation decision is seriously flawed and totally insupportable. Given the tremendous loss of credibility the waste program has suffered in the last several months, given the vote of no-confidence which this program received in the continuing resolution passed by Congress this past week, given the findings of this investigation, we request that you address the issues and failings cited in this letter and present a detailed plan to our Subcommittees in the next thirty days which establishes actions to restore the credibility of the waste program. In particular, such a plan should include a schedule for reevaluating the five sites according to a thorough and complete application of the multiattribute utility analysis.

Sincerely,

Ed Markey
Edward J. Markey
Member of Congress

Jim Weaver
James Weaver
Member of Congress

Al Swift
Member of Congress

Ron Wyden
Ron Wyden
Member of Congress

QUESTIONS FROM SENATOR EVANS

QUESTION 18: **The Subcommittees also transmitted a list of several written questions along with the report on October 29, 1986. Is it your intention to provide answers to these?**

ANSWER: DOE provided answers to the written questions on December 15, 1986. A copy of those answers is attached.

Congress of the United States
House of Representatives
Washington, D.C. 20515

October 29, 1986

The Honorable John S. Herrington
Secretary
U.S. Department of Energy
1000 Independence Avenue, S.W.
Washington, D.C. 20585

Dear Mr. Secretary:

In the course of our investigation of the high-level radioactive waste program, several internal Department of Energy documents came to our attention which raise questions as to the Department's plans for the first repository program.

The first document contains briefing materials prepared on May 13, 1986, which explore various options for modifying the high-level waste program. Among the options listed is the following:

> "Strategy Option - Redesign First Repository:
>
> Pros
> - Concentrate on first repository as primary waste disposal facility
> - Enhance systems optimization
> - Accomodate reactor on-site storage problems
> - Maintain legislated goals and planned receipt rates
>
> Cons
> - Increase potential for higher near-term costs
> - Increase pressure for rise in NWF [Nuclear Waste Fund] Fee
> - Continue to face institutional problems."

The clear and unmistakeable implication of this option is that the Department of Energy was considering the possibility of enlarging the first repository in order to accommodate all of the nation's waste.

In addition, a second document entitled "Considerations Bearing on the Timing for a Second Repository," dated May 16, 1986, explores in detail the potential for expanding the three sites chosen for the first repository. A table in this document projects the total potential capacity of the three sites: Hanford, Washington -- 668,000 metric tons of uranium (MTU); Yucca Mountain, Nevada -- 78,000-136,000 MTU; and Deaf Smith County, Texas -- 107,000 MTU. At one point, this study states that "[I]f adequate capacity is indeed available, considerations of system costs would argue for opening only a single repository site."

Congreſs of the United States
House of Representatives
Washington, D.C. 20515

October 29, 1986

The Honorable John S. Herrington
Secretary
U.S. Department of Energy
1000 Independence Avenue, S.W.
Washington, D.C. 20585

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The Honorable John S. Herrington
Page Two
October 29, 1986

The study goes on to compare the costs of a single repository system versus a two repository system.

We request that you provide answers to the following questions by November 10, 1986:

1) Is the Department of Energy considering the possibility of placing all the nation's waste in one repository?

2) Was the potential for expansion of the Hanford site a factor in the Department's decision to select that site?

3) Section 302(d) of the Nuclear Waste Policy Act of 1982 provides that the Secretary may make expenditures from the Waste Fund "only for purposes of radioactive waste disposal activities under titles I and II" of the Act. The studies and options papers, on the other hand, appear to consider options not permitted under the Act. Please cite the specific authorization in title I or II of the Act that permits you to make expenditures from the Waste Fund for these studies.

The waste program has been caught in a web of contradictory statements and political manipulations which have thoroughly entangled the Department's credibility. For instance, on one hand, Secretary Hodel has pronounced the second repository program dead. At the same time, Waste Office Director Ben Rusche says the program continues. It is time to make clear your intentions and policies on these matters, and to tell the same story to audiences in both the East and the West.

Sincerely,

Ed Markey
Edward J. Markey
Member of Congress

Al Swift
Member of Congress

Jim Weaver
James Weaver
Member of Congress

Ron Wyden
Ron Wyden
Member of Congress

The Secretary of Energy
Washington, DC 20585

December 15, 1986

Dear Mr. Weaver:

This is in response to your letter of October 29, 1986, in which you raised questions as to the Department of Energy's high-level radioactive waste management program. Enclosed are the responses to the three specific questions you asked.

Regarding your concern about the status of the second repository program, I would like to stress that the Department's position remains the same as announced on May 28, 1986. There is a second repository program in which the site-specific work has been postponed indefinitely.

Yours truly,

John S. Herrington
John S. Herrington

Enclosure

Honorable James Weaver
House of Representatives
Washington, D.C. 20515

Question 1: Is the Department of Energy considering the possibility of placing all the nation's waste in one repository?

Answer: No. Under the Nuclear Waste Policy Act of 1982, the only foreseeable case where all waste would go in one repository is if the total quantity were less than 70,000 metric tons of heavy metal, which we do not expect to be the case.

Question 2: Was the potential for expansion of the Hanford site a factor in the Department's decision to select that site?

Answer: No. The expansion of the Hanford site was not a factor in the Department's decision to select that site.

Question 3: Section 302(d) of the Nuclear Waste Policy Act of 1982 provides that the Secretary may make expenditures from the Waste Fund "only for purposes of radioactive waste disposal activities under titles I and II" of the Act. The studies and options papers, on the other hand, appear to consider options not permitted under the Act. Please cite the specific authorization in title I or II of the Act that permits you to make expenditures from the Waste Fund for these studies.

Answer: Studies and planning activities concerning alternatives (including the viability of those alternatives) for the conduct of the program pursuant to the NWPA constitute administrative activities that are authorized to be funded under Section 302(d)(3) of the NWPA.

QUESTIONS FROM SENATOR EVANS

QUESTION 19: Does the Department intend to complete a more objective and thorough MUA based on all factors as requested by the Subcommittees? If not, why?

ANSWER: The DOE does not "intend to complete a more objective and thorough MUA" because the MUA as documented in DOE/RW-0074 is objective and thorough. That is not to say that the MUA is perfect, or that it could not have been improved. We believe only that the MUA was adequate for the task at hand and that it was good enough to aid in responsible decision-making. This opinion of the MUA was supported by the BRWM/NAS in its final review letter to B. Rusche, dated April 10, 1986.

With regard to the judgment not to perform the additional portfolio analysis needed to consider the effects of rock-type diversity, we acknowledge that such an analysis might possibly have provided additional insights about the relative desirability of portfolios of three sites. As in any formal siting study, decisions had to be made about what and what not to include in the formal analysis. It was our judgment that the extra time, cost, and effort necessary to perform a formal portfolio analysis was not required to make a responsible decision. A rigorous, formal evaluation of the effects of diversity would require a more complex form of analysis involving highly speculative judgments about such things as future licensing actions. Instead, we considered the portfolio effects qualitatively, as is commonly done in other portfolio-type problems. We believe such an approach is entirely consistent with the Act and the siting guidelines.

In summary, we believe any additional analysis beyond what was done to support the May 28 decisions would not be cost-effective. We have seen nothing to indicate that application of a formal portfolio analysis would reveal important new insights that would warrant reconsideration of our decision.

QUESTIONS FROM SENATOR ADAMS

QUESTION 1: **Last week at your briefing on the Department's proposed amendment to the Mission Plan you stated that it would take an affirmative act of Congress to override or alter the program you will propose in the amendment. For the record, is it the Department's position that it is necessary for Congress to affirmatively act to reject, alter, or override the Mission Plan amendment once the Department sends it to Congress?**

ANSWER: The schedules set forth in the draft amendments to the Mission Plan were based solely upon programmatic judgments. They were not intended to set forth any particular legal position, but rather to describe the Department's considered and informed judgments, based on its actual experience in administering these programs, of the course and timing that the first and second repository programs should take given current circumstances. The Department recognizes that carrying out these programs in the way described in the proposed amendments to the Mission Plan will require Congressional approval.

QUESTIONS FROM SENATOR ADAMS

Question 2: On July 30, 1986, the Department supplied to the House Energy and Commerce Committee a package of materials concerning the procedures followed by the Department in making its site selection decisions announced on May 28, 1986.

The materials include a series of option papers concerning the decision to terminate or suspend the second repository program which explicitly cite the political benefits or detriments of various options including the option eventually chosen by the Department. Several of these memoranda are dated April 30 and May 13 and May 21, 1986.

For the record, under whose direction were the memoranda relating to the crystalline repository decision prepared?

The cover letter to the House Committee states that these memoranda were discussed in "meetings and discussions" involving Mr. Purcell, members of his staff, representatives of the Crystalline Project Office and yourself. Did you participate in such meetings? If so, on what dates?

Did you participate in any discussions with the Secretary, DOE'S Office of General Counsel, or any other individual within the Department concerning those memoranda, their content, or the conclusions reached in the meetings and discussions involving those memoranda?

Did you participate in any other discussions with the Secretary or any other individual concerning the political repercussions, electoral or in terms of political opposition to potential repository sites, during the process of making the May 28, 1986 decisions?

Answer: The memoranda that were referred to in the question were developed by the Department's Chicago Operations Office at their initiative in preparation for discussions with me regarding the Crystalline Repository Project.

The Director (OCRWM) participated in discussions with members of my staff and with members of the Crystalline Project Office. These meetings took place on May 1, 1986, May 13, 1986, and May 21-22, 1986.

Discussions were not held with the Secretary, DOE's Office of General Counsel, or any other individual within the Department concerning the memoranda or their content. Discussions concerning the second repository program were held with Under Secretary Salgado on May 6, 1986 and May 8, 1986, and with Under Secretary Salgado and Secretary Herrington on May 22, 1986 and May 26, 1986. These discussions were person to person and did not involve any documents, memoranda, notes, papers, drafts, correspondence, etc.

Mr. Rusche did not participate in any discussions with the Secretary or any other individual concerning the political repercussions, electoral or in terms of political opposition to potential repository sites, during the process of making the May 28, 1986 decisions.

C+C
Nevada

The Secretary of Energy
Washington, DC 20585

January 28, 1987

Honorable Richard H. Bryan
Governor of Nevada
Carson City, Nevada 89710

Dear Governor Bryan:

Thank you for your letter of December 16, 1986, responding to the Department of Energy's efforts to initiate negotiations to establish a binding, written Consultation and Cooperation (C&C) Agreement pursuant to Section 117(c) of the Nuclear Waste Policy Act of 1982 (the Act).

I fully agree with the view expressed in your letter that the concept of the development of a binding, written agreement between an affected State, such as Nevada, and the Department, as envisioned by Congress, has considerable merit. However, I am concerned that the State would link progress toward such an agreement with the resolution of the outstanding disagreements and litigation between the State and the Department.

The agreement, as specified by Section 117(c) of the Act, is intended to set forth negotiated procedures by which the Department will fulfill the consultation and cooperation requirements of the Act. By clarifying in a negotiated, written, binding agreement, the procedures for how the consultation and cooperation requirements are to be carried out, many of the problems such as those experienced in the past between the State and the Department should not occur.

I am not suggesting that a C&C agreement will solve, or was intended to solve, all of our problems. Those remaining will have to be addressed by whatever mechanisms are appropriate. However, I do not believe that the existence of current disagreements between the State and the Department should bar us from entering into negotiations on a C&C agreement to achieve the purposes specified in Section 117 of the Act. Don Schueler of the Nevada Operations Office will be contacting Robert Loux of your staff to arrange for further discussions.

With respect to the State's 1987 grant, the Department is in the process of resolving outstanding issues and expects to be able to make an award in the very near future.

Yours truly,

John S. Herrington

John S. Herrington

THE STATE OF NEVADA
EXECUTIVE CHAMBER
Carson City, Nevada 89710

RICHARD H. BRYAN
Governor

TELEPHONE
[illegible]

ATTACHMENT 1

December 16, 1986

The Honorable John S. Herrington
The Secretary of Energy
U.S. Department of Energy
Washington, D.C. 20585

Dear Mr. Secretary:

I have reviewed Mr. Rusche's November 19, 1986 letter seeking to enter into a binding written agreement with the State of Nevada pursuant to Section 117(c) of the Nuclear Waste Policy Act, 42 U.S.C. 10137(c). His letter proposes commencement of negotiations with a "team" of Department of Energy personnel headed by Mr. Don Schueler, Deputy Manager of the Nevada Operations Office.

I believe that the concept of the development of a written agreement between an affected State, such as Nevada, and the Department of Energy, as originally envisioned by Congress, has considerable merit and Congress should be commended for their foresight in this regard. However, I do not believe that Congress or any of the affected states envisioned that the Department of Energy would have acted irresponsibly and illegally in implementing the Act as has now become so apparent.

As you know, I, along with the Attorney General and the entire congressional delegation have filed actions challenging the legality of nearly every major decision that the Department has made in this program. These challenges are supported by a broad spectrum of the citizens of Nevada. These actions challenge the validity, as well as the legality, of this program,

and to the extent that they are successful, major program decisions regarding site selection that you have made may be declared null and void and the entire siting process restarted. This may include the development of new siting guidelines, rescreening for potentially acceptable sites, the development of new environmental assessments, and restarting the second repository program.

Given the way in which the department has implemented the Act, it is now impossible for the State of Nevada to have confidence or trust in any negotiations with the Department of Energy regarding the implementation of the balance of the program until the uncertainties surrounding the aforementioned concerns are resolved by the courts, Congress or by the Department.

To the extent that our concerns regarding the legality of the siting guidelines, the site selection process, the environmental assessments and the timing of the preliminary determination of suitability required by Section 114(f) of the Act and the second repository program are negotiable, then perhaps discussion regarding a possible written agreement may be appropriate, and I'd appreciate your consideration of those matters.

Additionally, the manner in which the Department of Energy has treated the State of Nevada in attempting to consult and cooperate, as required by the Act, has compounded this situation. The Department has conducted its grants application process in an arbitrary fashion. As you know, Nevada has been forced to seek review by the courts of the way in which the Department has used the grants process to limit the State's participation in the program, and it appears that, even though the court ruled in our favor, we now may be forced back to court over our current grant application.

This lack of cooperation also diminishes our confidence that the Department would honor the terms of a written agreement any more than it has lived up to the statutory requirements of the Act. Should the Department be sincerely interested in consulting and cooperating with the State of Nevada, it can demonstrate that commitment by fulfilling our grant request without the continuing difficulties which has been present in nearly every one of our past, as well as our current, grant requests.

I'd appreciate your consideration of these concerns, and I would be happy to provide any further information you may require. Robert Loux, Director of State Nuclear Waste Project office will be available to discuss our concerns with Mr. Rusche or Mr. Schueler at any mutually convenient time.

Sincerely,

RICHARD H. BRYAN
Governor

RHB/dkl

cc: Mr. Ben Rusche
Mr. Don Schueler
Mr. Grant Sawyer

DOE F [illegible]
(7-81)

U.S. DEPARTMENT OF ENERGY

NOTICE OF FINANCIAL ASSISTANCE AWARD

(See instructions on Reverse)

lr

Under the authority of Public Law 95-91, 42 U.S.C. 7101, Department of Energy Organization Act and subject to legislation, regulations and policies applicable to *(cite legislative program title)*: Nuclear Waste Policy Act of 1982, P.L. 97-425

1. PROJECT TITLE
Nuclear Waste Disposal Evaluation

2. INSTRUMENT TYPE
☒ GRANT ☐ COOPERATIVE AGREEMENT

3. RECIPIENT *(Name, address, zip code, area code and telephone no.)*
State of Nevada
Nevada Agency for Nuclear Projects
Capitol Complex
[illegible]

4. INSTRUMENT NO.
DE-FG08-85NV10461

5. AMENDMENT NO.
M008

6. BUDGET PERIOD
FROM 6/1/86 THRU 2/28/87

7. PROJECT PERIOD
FROM 2/1/85 THRU [illegible]

8. RECIPIENT PROJECT DIRECTOR *(Name and telephone No.)*
Robert R. Loux (702) 885-3744

9. RECIPIENT BUSINESS OFFICER *(Name and telephone No.)*
Robert R. Loux (702) 885-3744

10. TYPE OF AWARD
☐ NEW ☐ CONTINUATION ☐ RENEWAL
☐ REVISION ☒ SUPPLEMENT

11. DOE PROJECT OFFICER *(Name, address, zip code, telephone No.)*
D. L. Vieth (702) 295-3662
U.S. Department of Energy
P.O. Box 14100, Las Vegas, NV 89114-4100

12. ADMINISTERED FOR DOE BY *(Name, address, zip code, telephone No.)*
D. L. Vieth (702) 295-3662
U.S. Department of Energy
Post Office Box 14100
Las Vegas, NV 89114-4100

13. RECIPIENT TYPE
☒ STATE GOV'T ☐ INDIAN TRIBAL GOV'T ☐ HOSPITAL ☐ FOR PROFIT ORGANIZATION ☐ C ☐ P ☐ SP ☐ INDIVIDUAL
☐ LOCAL GOV'T ☐ INSTITUTION OF HIGHER EDUCATION ☐ OTHER NONPROFIT ORGANIZATION ☐ OTHER *(Specify)*

14. ACCOUNTING AND APPROPRIATIONS DATA

a. Appropriation Symbol	b. B & R Number	c. FT AFP/OC	d. CFA Number
89X5227	DB-01-02-05		NA

15. EMPLOYER I.D. NUMBER/SSN
D88-6000022

16. BUDGET AND FUNDING INFORMATION

a. CURRENT BUDGET PERIOD INFORMATION

(1) DOE Funds Obligated This Action	$ 0
(2) DOE Funds Authorized for Carry Over	$ 7,025
(3) DOE Funds Previously Obligated in this Budget Period	$ [illegible]
(4) DOE Share of Total Approved Budget	$ [illegible]
(5) Recipient Share of Total Approved Budget	$ 0
(6) Total Approved Budget	$ 4,425,779

b. CUMULATIVE DOE OBLIGATIONS

(1) This Budget Period *[Total of lines a.(1) and a.(3)]*	$ 4,418,754
(2) Prior Budget Periods	$ 1,898,778
(3) Project Period to Date *[Total of lines b. (1) and b. (2)]*	$ 6,317,532

17. TOTAL ESTIMATED COST OF PROJECT $ 10,000,000
(This is the current estimated cost of the project. It is not a promise to award nor an authorization to expend fun

DUPLICATE [illegible]

18. AWARD/AGREEMENT TERMS AND CONDITIONS

This award/agreement consists of this form plus the following:

a. Special terms and conditions (if grant) or schedule, general provisions, special provisions (if cooperative agreement)

b. Applicable program regulations *(specify)* NA *(Date)*

c. DOE Assistance Regulations, 10 CFR Part 600, as amended, Subparts A and ☒ B (Grants) or ☐ C (Cooperative Agreements)

d. Application/proposal dated February 12, 1986, ☐ as submitted ☒ with changes as negotiated

19. REMARKS
This amendment extends the expiration date for the current budget period from January 31, 1987, to February 28, 1987.

20. EVIDENCE OF RECIPIENT ACCEPTANCE
2-3-87
(Signature of Authorized Recipient Official) *(Date)*
Robert R Loux
(Name)
Executive Director
(Title)

21. AWARDED BY
Thomas R. Clark JAN 29 1987
(Signature) *(Date)*
Thomas R. Clark
(Name)
Contracting Officer
(Title)

DOE F 1325.8

United States Government

Department of Energy

memorandum

DATE FEB 0 5 1987

REPLY TO ATTN OF: RW-223

SUBJECT: Concurrence on Nevada Grant Award

TO: Don Vieth, NNWSI

Attached is Headquarter's concurrence on the initial 1987 grant award to the State of Nevada.

If you have any questions, please contact Allen Benson at FTS 896-1116.

S.H. Kale

Stephen H. Kale
Associate Director for
Geologic Repositories
Office of Civilian Radioactive
Waste Management

Attachment

States Government Department of Energy

emorandum

February 4, 1987

REPLY TO ATTN OF: RW-223

SUBJECT: Notice of Concurrence Action

TO: Don Vieth

REVIEW:

6,590,413

Draft award documents for proposed grant, number [illegible], A009 in the amount of $ ~~6,7[illegible]~~, from the State/Tribe Nevada, have been received by the Office of Geologic Repositories.

ACTION:

XXX CONCUR
___ NONCONCUR
___ REVIEW-SCHEDULE BELOW

COMMENTS:

S. H. Kale

Stephen H. Kale
Associate Director for
Geologic Repositories
Office of Civilian Radioactive
Waste Management

FEB 12 1987

Robert R. Loux, Jr., Executive Director
Nuclear Waste Project Office
State of Nevada
Evergreen Center
Suite 252
1802 North Carson Street
Carson City, NV 89701

GRANT NO. DE-FG08-85NV10461, ANALYSIS OF CY 1987 GRANT APPLICATION

This letter has been prepared pursuant to our meeting of December 16, 1986, in which we discussed the status of our review of the State's grant application. We have completed our analysis of the grant application to determine its consistency with the Nuclear Waste Policy Act, applicable regulations, and our guidance. At this time we will recommend that the Nevada Operations Office (NV) Contracting Officer authorize funding of $6,590,413. We require additional information before we can reach an informed decision on activities totalling $3,199,796. A discussion of the activities approved by Waste Management Project Office (WMPO), and those requiring additional substantiation, are enumerated in Enclosure 2. Since $175,000 of this amount is for an engineering contractor, and during the December 16, 1986, meeting it was agreed that the engineering effort was not required at this time, funding in the amount of $175,299 will not be recommended. The balance of $299 represents interest expense which is unallowable in accordance with the Office of Management and Budget Circular A-87. Our approach to evaluating the independent technical studies is presented in Enclosure 1.

As stated in our meeting of December 16, 1986, we are currently prepared to take action to authorize funding for those activities agreed to for the budget period March 1 through December 31, 1987. Upon satisfactory resolution of our concerns regarding those activities requiring further substantiation, the WMPO will recommend that the NV Contracting Officer provide additional funding.

We look forward to meeting with you in the near future and to a prompt resolution of the remaining activities for funding. Please contact Wayne N. Kozai of my staff to arrange a meeting to discuss your grant in further details.

Mitchell P. Kunich
Original Signed By
for
Donald L. Vieth, Director
Waste Management Project Office

WMPO:WNK-982

Enclosures:
As stated

cc w/encls:
V. J. Cassella, HQ (RW-222) FORS
C. M. Smith, HQ (RW-42) FORS
A. B. Benson, HQ (RW-252) FORS

bcc:
J. R. Barner, WMPO, NV
D. B. Morse, CPO, NV
WMPO R
WMPO RF
MGR RF

DOE F 1325.8
(12-84)

United States Government Department of Energy

memorandum

DATE: FEB 12 1987

REPLY TO ATTN OF: RW-223

SUBJECT: Headquarters Review Criteria for Facility-Specific Outreach and Participation Plans

TO: J. Neff, SRPO
D. Vieth, NNWSI
J. Anttonen, BWIP

I appreciate the efforts of you and your staff to assist in the development of the Headquarters Review Criteria for Facility-Specific Outreach and Participation Plans (FSOPPs) through written comments and through the September and December ISCG discussions. The site-specific meetings between Headquarters and Project Office staff next month will be another opportunity to discuss the Review Criteria, the FSOPPs, and the interactions that will occur between DOE staff and affected parties as the FSOPPs are developed. To assist in that discussion, I would like to respond to some of the issues that have been raised.

FSOPP Scope

Some Project Office comments have indicated that clarification is needed on the scope of the FSOPPs. The Mission Plan and the OGR Guidelines for Intergovernmental and Public Participation Activities specify that the FSOPPs address the information and interaction needs of State, Indian Tribe, and local parties. The FSOPPs are intended to be comprehensive plans for the needs of all affected parties, not just local parties or the public, as Project Office comments suggest. The FSOPPs will document DOE's efforts to interact with all affected parties on major milestones in the repository program and on an ongoing basis.

FSOPP Development

Project Office comments have also indicated that clarification is needed on the FSOPP development process. The NNWSI comments (Nov. 26 memorandum from D. Vieth to B. Gale, attached) contain the following development process:

> "It is our understanding that in developing the document you would like us to do the following:
>
> 1. 'Negotiate' major milestone-based activities with affected parties.
> 2. Reach some type of agreement about what these activities should encompass.
> 3. Package this 'draft' agreement as an FSOPP.
> 4. Forward it to HQ for use in discussion with technical managers."

The SRPO comments (Oct. 2 memorandum from J. Neff to B. Gale, attached) also refer to FSOPPs as an agreement:

> "As you know, SRPO intends to develop the FSOPP through interactions with the affected publics. We encourage HQ participation in these interactions at every level. Once the FSOPP is drafted, however, it will greatly reduce DOE credibility and trust to have provisions agreed to reversed by another DOE office."

FSOPPs are DOE plans, not agreements between DOE and affected parties. Both the Mission Plan and the OGR Participation Guidelines specify that FSOPPs are DOE plans for addressing the information and interaction needs of affected parties, as identified through informal discussions. The OGR Participation Guidelines specify in Section 6.2 that the draft FSOPPs, which are to be developed by the Project Offices after informal discussions with affected parties, are to be sent to Headquarters before being provided to affected parties. This process will help to avoid making commitments that cannot be kept, a concern that has been raised by the Project Offices and that is shared by Headquarters.

Milestone-Related Planning

In their comments, NNWSI stated that "If you would share with us your ideas about what milestones you believe could serve as the basis for public participation, we will be pleased to develop a plan based on appropriate milestones." The Draft Headquarters Review Criteria, which was distributed at the December 1986 ISCG meeting, contain the milestones that Headquarters has identified as basic for institutional activities.

As indicated in the scope section of the Review Criteria, the milestone checklists are not necessarily restrictive. If there are other milestones that affected parties want to add, Project Offices should determine whether to include those milestones and what institutional activities are appropriate. The FSOPP is a DOE plan, and, as with other DOE documents, DOE is responsible for the final content of the plan. The Review Criteria provide policy guidance on minimum milestones for inclusion in the plans.

Definition of Public Participation

NNWSI raises the issue of what role the public has in the program. We agree with NNWSI's position:

> "Based on our experience, we suspect that the public may best participate through its elected officials, through formal processes such as comments on major program documents and advisory committees, and through relatively limited feedback mechanisms during information meetings or briefings.

> However, we must still address how the State and local government representatives will participate in the program. We assume this document must also address this group of people."

The State, Indian Tribe, and local government officials who will be involved in the FSOPP development process represent the interests of the public.

Resources for FSOPP Development

Concerns have been expressed about the resources that will be required for development of the FSOPPs. We consider the FSOPPs to be a major repository program institutional activity that is essential to successfully implement our technical program activities. During the budget process, we specifically ensured adequate resources were identified in the FY '87 budget for the FSOPP development process.

I hope that I have clarified some of the important issues that have been raised concerning the FSOPP process. I would like to emphasize how much we appreciate the efforts of you and your staff in commenting on the HQ Review Criteria and look forward to working with you as your plans are developed. Please contact Barry Gale or Carol Peabody of my staff if you have further questions.

Stephen H. Kale
Associate Director for
Geologic Repositories
Office of Civilian Radioactive
Waste Management

Attachments

cc: L. McClain, SRPO
M. Powell, RL
E. Lundgaard, NNWSI
T. Isaacs, RW-22
J. Bresee, RW-22
B. Gale, RW-223
C. Peabody, RW-223
R. Gale, RW-40
J. Saltzman, RW-42
B. Easterling, RW-42
G. King, RW-43
G. Pitchford, CH
M. Talbot, RL
C. West, NNWSI

Department of Energy
Nevada Operations Office
P. O. Box 14100
Las Vegas, NV 89114-4100

NOV 26 1986

Barry G. Gale, Office of Geologic Repositories, DOE/HQ (RW-223) FORS
ATTN: Carol Peabody, DOE/HQ (RW-223) FORS

COMMENTS ON "INSTITUTIONAL ACTIVITY CHECKLIST FOR DEVELOPMENT OF HEADQUARTERS (HQ) FACILITY SPECIFIC OUTREACH AND PUBLIC PARTICIPATION PLAN (FSOPP) REVIEW CRITERIA

At the September 1986 ISCG meeting, you requested comments from Project Offices on the "Institutional Activity Checklist for Development of HQ FSOPP Review Criteria" contained in the reference package. We wish to express our regrets in the delay in providing our comments along with our concerns about the approach that appears to be contained in this outline.

We want to start by emphasizing that we agree that institutional considerations are essential to the success of the repository program. We applaud and support constructive efforts to sensitize Office of Civilian Radioactive Waste Management's (OCRWM) and Project Office's staffs to these vital considerations. However, we need to maintain a clarity of vision with respect to the objectives of the FSOPP, and reinforce the idea that it should be sharply focused on the known audience. We are concerned that the scope of the FSOPP has been expanded to serve as a management tool rather than a realistic, attainable description of DOE-State/Public interactions. The thought of broadening its scope to cover a multiplicity of purposes is not likely to be constructive, practical, or to accomplish the alternative goals.

Our approach to the FSOPP began with a review of the OCRWM Mission Plan requirements. We then analyzed the general Mission Plan language in the context of our four years' experience in dealing with the State of Nevada, local governments and the public. Then we made our best estimate of future DOE and affected party requirements in both intergovernmental and public arenas. The conclusion was that the NNWSI Project Outreach and Public Participation Plan should:

- o Develop a clear definition of the concept of "public participation," and explain "in what" the states and the public will be invited to participate;
- o Spell out the manner in which the NNWSI Project would do business with the State, local governments, and the public, based on discussions with these parties;
- o Encompass on-going, continuous activities that apply not only to major milestones but to routine interactions;
- o Avoid being overly bureaucratic and dictatorial in tone; and

- o Be extremely careful to avoid raising affected parties' expectations by making commitments that cannot be kept.

It is our understanding that in developing the document you would like us to do the following:

1. "Negotiate" major milestone-based activities with affected parties.
2. Reach some type of agreement about what these activities should encompass.
3. Package this "draft" agreement as an FSOPP.
4. Forward it to HQ for use in discussion with technical managers.

If our understanding is correct, we have several concerns about this approach.

We believe that the fundamental approach may be unworkable until two major areas are clarified. First, a reasonable understanding of the nature and concept of "public participation" is required. Until it is clear exactly what this means, it will be difficult to explain how the Project Office plans to conduct "participation." The repository program must come to grips with this basic question and provide guidance on how this activity should be defined. Based on our experience, we suspect that the public may best participate through its elected officials, through formal processes such as comments on major program documents and advisory committees, and through relatively limited feedback mechanisms during information meetings or briefings. However, we must still address how the State and local government representatives will participate in the program. We assume this document must also address this group of people.

Our second concern is the utilization of milestones as a basis for writing the document. We are puzzled about how we will involve the public or the local government officials in many of our major programmatic milestones. While it will be possible to explain how the State and public will participate by making formal comments on the Site Characterization Plan or in the scoping hearings for the EIS, it is difficult to understand how they should be involved in the review of the Exploratory Shaft Title II design, the readiness review prior to construction, the start of construction, or the completion of in situ testing, etc. While we recognize the importance of milestones as an indication of progress, their use as the focus of the public participation effort requires additional consideration. If you would share with us your ideas about what milestones you believe could serve as the basis for public participation, we will be pleased to develop a plan based on appropriate milestones. To assist this review, we have enclosed a list of nearly 300 NNWSI Project Level 1 and Level 2 milestones.

We have reviewed your draft list of FSOPP review criteria. Unfortunately, although the draft denotes factors to be included in the FSOPP, the basis for judging the adequacy of included factors is not indicated. It would be difficult to assess whether enough attention to detail has been given to meet OGR's expectations. It would be helpful if you could be more specific, if you could tell us not only "what" but "how much," so the Project Office could produce a sufficient document.

The draft review criteria indicates a substantial desire for detailed information in the draft FSOPPs. However, we must question whether the information requested will be relevant to each milestone or of value to the public. For example, consider the readiness review for the exploratory shaft, a milestone that we consider significant. After considering the proposed checklist, we have the following questions:

- What data would be appropriate to share with the affected parties (the public)?
- To whom should we provide copies of the draft readiness review checklist and criteria?
- Is it really appropriate to notify State, Indian Tribes and local officials of this program activity?
- Do we really expect to issue a press release and hold a press conference on this?
- Do we really expect to conduct a site tour for such an activity?

Providing all the requested information about every milestone would no doubt make the plan complete and thorough. However it could also be overkill, and because of the excessive detail, it could miss the objective of communicating information about the points that are critical.

There is another aspect that is equally troubling. If we follow this approach, it would strongly imply that the public would be involved in a meaningful way. By this we mean there would appear to be commitment that the public could influence the outcome. It is not obvious to us that the technically inexperienced public could be meaningfully involved in milestones such as the ES readiness review, or even the start of ES construction. Another danger is inviting the public to participate in activities in a non-meaningful way; that is, they "participate" but they have no effect or influence. This would not be a reasonable proposal. Therefore, we come back to our basic question: "public participation in what?"

Finally, the issue of credibility is a paramount importance to the repository program. We believe the State of Nevada would negotiate or seriously review all of these milestones only if the State was guaranteed that the effort would produce tangible results. At the very least, such discussion would raise expectations that results would be forthcoming. We do not feel that we, in good faith, could provide such a guarantee. To proceed as proposed, despite our misgivings, could have serious ramifications on our somewhat battered, but still functioning, working relationship with the State. For this reason it would be important to understand from a policy viewpoint the milestones the Project should be willing to negotiate over in the development of the plan.

In summary, we believe that we need to seriously reconsider the content and objective of the FSOPP. We strongly believe that the document needs to be "activity oriented" by outlining how people, both government representatives as well as the public, can participate meaningfully in our activities. The activities that need to be discussed in the plan are ones that provide the opportunity to truly influence the course of the program. Offering token "participation" in activities that offer no opportunity to influence the program could be considered a sham. We strongly believe that a document with this potential interpretation would not be beneficial to the projects or to the program. With regard to this point, you might want to reflect on ideas developed and presented to the public in the State of Nevada by Jim Creighton. We, as you, are eager to build program credibility through meaningful interactions with affected parties, and we hope to use the NNWSI Project Outreach and Public Participation Plan as our outline.

Donald L. Vieth

Donald L. Vieth, Director
Waste Management Project Office

WMPO:DLV-453

Enclosure:
As stated

cc w/encl:
S. M. Volek, SAIC, Las Vegas, NV
B. E. Reilly, SAIC, Las Vegas, NV
V. J. Cassella, DOE/HQ (RW-222) FORS
C. L. West, OPA, DOE/NV
W. R. Dixon, WMPO, DOE/NV
E. L. Lundgaard, WMPO, DOE/NV

NEVADA NUCLEAR WASTE STORAGE INVESTIGATIONS
LEVEL 1 & 2 MILESTONES IN A TIME WINDOW OF 01 Oct 1985 TO 30 Sep 1987
Run Date: 11 November 1986
RESP:

MILESTONE	LEVEL	MILESTONE DESCRIPTION	WBS	NVO PLANNED	HQ PLANNED
N405 (B)	1	Horizontal Waste Emplacement Equipment Development Plan	1 2.4 2.2 1 5	28 Feb 86	30 Apr 86

NEVADA NUCLEAR WASTE STORAGE INVESTIGATIONS
LEVEL 1 & 2 MILESTONES IN A TIME WINDOW OF 01 Oct 1985 TO 30 Sep 1987
Run Date: 11 November 1986
RESP: DRI

MILESTONE	LEVEL	MILESTONE DESCRIPTION	WBS	NVO PLANNED	HQ PLANNED
DRI					
N397 (P)	2	Summary Report of NNWSI Arch Studies Performed Before 28-May-86	1.2.3.6.1.U	15 Dec 86	
N393 (P)	2	Quarterly Arch Survey Report I	1.2.3.6.1.U	30 Dec 86	
N394 (P)	2	Quarterly Arch Survey Report II	1.2.3.6.1.U	31 Mar 87	
N395 (P)	2	Quarterly Arch Survey Report III	1.2.3.6.1.U	30 Jun 87	
N396 (P)	2	Quarterly Arch Survey Report IV	1.2.3.6.1.U	30 Sep 87	

NEVADA NUCLEAR WASTE STORAGE INVESTIGATIONS
LEVEL 1 & 2 MILESTONES IN A TIME WINDOW OF 01 Oct 1985 TO 30 Sep 1987
Run Date: 11 November 1986
RESP: H&N

MILESTONE	LEVEL	MILESTONE DESCRIPTION	WBS	NVO PLANNED	HQ PLANNED
H&N					
R208 (P)	2	Holmes and Narver submit QA Program Plan to WMPO	1 2 9 3 H	31 Jan 86	

NEVADA NUCLEAR WASTE STORAGE INVESTIGATIONS
LEVEL 1 & 2 MILESTONES IN A TIME WINDOW OF 01 Oct 1985 TO 30 Sep 1987
Run Date: 11 November 1986
RESP: LANL

MILESTONE	LEVEL	MILESTONE DESCRIPTION	WBS	NVO PLANNED	HQ PLANNED
LANL					
R395 (P)	2	Issue Report: Particulate Content of Yucca Mountain Waters	1.2.3.4.1.1.A	29 Sep 87	
R357 (P)	2	Issue Report: Model for Kinetics of Cristobalite to Quartz Transition	1.2.3.4.1.3.A	26 Sep 86	
R359 (P)	2	Issue Report: Preliminary Conceptual Model for Mineral Evolution at Yucca Mountain	1.2.3.4.1.3.A	28 Aug 87	
R393 (P)	2	Issue Final Report: Pu IV Carbonate Speciation	1.2.3.4.1.4.A	27 Mar 87	
R396 (P)	2	Issue Report: Effect of Microbiological Activity on Retardation	1.2.3.4.1.5.A	31 Mar 87	
M578 (B)	2	Draft Site Characterization Plan (SCP) Chapter 8 - LANL Input for Subsection 8.3.1	1.2.5.2.2.A	09 Jun 86	
M651 (B)	2	Issue ES Test Implementation & Control Plan	1.2.6.1.1.A	22 Aug 86	
M652 (B)	1	Start First Shaft (ES-1) Construction	1.2.6.1.1.A	28 Aug 86	28 Aug 86
M613 (B)	2	Issue the Revision of the ESF Title II Design for Subcontractor:Bid Package	1.2.6.1.1.A	19 Sep 86	
M642 (B)	2	Issue Revised Surface Title II Design for ESF	1.2.6.1.1.A	19 Sep 86	
M645 (B)	1	Start ESF Site Preparation	1.2.6.2	01 Dec 86	01 Dec 86
M666 (B)	2	Issue Exploratory Shaft Test Plan (ESTP) (NVO-244)	1.2.6.9.1.A	28 Mar 86	
M649 (B)	2	Completion of DOE/NRC Workshop on ESTP	1.2.6.9.1.A	15 Jan 87	
M612 (B)	1	Begin ESF Testing	1.2.6.9.2	31 May 87	31 May 87
M693 (B)	2	Begin Chlorine 36 Dating Pore Water Test	1.2.8.9.2.4.1.A	28 Aug 88	
M667 (B)	2	Complete IDS Surface Acquisition System & Surface Sensors	1.2.6.9.3.A	20 Aug 86	

NEVADA NUCLEAR WASTE STORAGE INVESTIGATIONS
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RESP: LLNL

MILESTONE	LEVEL	MILESTONE DESCRIPTION	WBS	NVO PLANNED	HQ PLANNED
LLNL					
P001 (B)	2	Report on Radionuclide Release Rate Testing of Spent Fuel in J-13 Water at 70 degree C	1.2.2.3.1.L	30 Sep 86	
R205 (P)	2	Report on Release Rate Testing of Spent Fuel in J-13 Water at 85 Degrees C	1.2.2.3.1.L	30 Jun 87	
M594 (B)	2	Draft Site Characterization Plan (SCP) Chapter 8 - Input Section 8.3.4	1.2.5.2.2.L	30 May 86	
R033 (P)	1	The shaft Construction Readiness Review Meeting will be Held	1.2.6.1.1.A	30 Apr 87	30 Apr 87
M708 (B)	1	Final Report on the SFT-C	1.2.7.2.1.L	28 Dec 85	28 Feb 86

NEVADA NUCLEAR WASTE STORAGE INVESTIGATIONS
LEVEL 1 & 2 MILESTONES IN A TIME WINDOW OF 01 Oct 1985 TO 30 Sep 1987
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RESP. REECO

MILESTONE	LEVEL	MILESTONE DESCRIPTION	WBS	NVO PLANNED	HQ PLANNED
REECO					
R013 (P)	2	Start ESF Surface Facilities Construction	1.2.6.3.1 R	31 Dec 86	

NEVADA NUCLEAR WASTE STORAGE INVESTIGATIONS
LEVEL 1 & 2 MILESTONES IN A TIME WINDOW OF 01 Oct 1985 TO 30 Sep 1987
Run Date: 11 November 1986
RESP: SAIC

MILESTONE	LEVEL	MILESTONE DESCRIPTION	WBS	NVO PLANNED	HQ PLANNED
SAIC					
P114 (B)	2	Submit Comments for Yucca Mountain MGDS Description to SNL	1.2.1.2.4.T	06 Jun 86	
P903 (B)	2	Work Breakdown Structure (WBS) Dictionary Update	1.2.1.2.5.T	30 Sep 86	
P902 (B)	2	Prepare Project Budget and Cost Plans From Participant Input for CCB Baseline Action (Funding $147,323,000)	1.2.1.2.5.T	01 Dec 86	
P917 (P)	2	Yucca Mountain Site Specific MGDS Description Baselined and Submitted to DOE/HQ	1.2.1.2.5.T	02 Mar 87	
P914 (P)	2	Submit Revised NNWSI Project Administrative Procedure AP 3.3, Change Control Process, to WMPO/NV	1.2.1.2.5.T	15 Apr 87	
P921 (P)	2	Submit Revised NNWSI Project Administrative Procedure AP 3.1 - Management Baseline to WMPO/NV	1.2.1.2.5.T	15 Apr 87	
P919 (P)	2	Submit Letter Confirming Operational Status of the Configuration Management Information System to WMPO/NV	1.2.1.2.5.T	30 May 87	
P920 (P)	2	Submit NNWSI Project Administrave Procedure AP 3.5 - Regulatory Baseline, to WMPO/NV	1.2.1.2.5.T	15 Jun 87	
P916 (P)	2	Submit Configuration Management Training Plan to WMPO/NV	1.2.1.2.5.T	15 Aug 87	
P918 (P)	2	Submit NNWSI Project Administrative Procedure AP 3.4 - Technical Baseline to WMPO/NV	1.2.1.2.5.T	30 Sep 87	
P922 (P)	2	Submit Baselined Updated Systems Requirement Document to DOE/HQ	1.2.1.2.5.T	30 Sep 87	
P800 (B)	2	Submit Draft Site Integration Management Plan to WMPO/NV	1.2.3.1.T	30 Sep 86	
P803 (B)	2	Submit Semi-Annual Site Integration Status Report to WMPO/NV	1.2.3.1.T	30 Sep 86	
P802 (B)	2	Submit Final Site Integration Management Plan to WMPO/NV	1.2.3.1.T	14 Nov 86	
P500 (B)	2	Submit Draft Site Investigations Field Activities Plan to WMPO/NV	1.2.3.1.T	15 Nov 86	
P563 (P)	2	Issue Site Atlas	1.2.3.1.T	30 Jan 87	
P564 (P)	2	Issue Updated Site Atlas	1.2.3.1.T	30 Jun 87	
P140 (P)	2	Begin Operational Tests of Core Sample Facility Procedures	1.2.3.5.1.T	11 Aug 86	
P143 (P)	2	Submit Draft Quality Assurance (QA) and Technical Procedures for Sample Management Facility (SMF) Operationsto WMPO/NV	1.2.3.5.1.T	24 Apr 87	
P144 (P)	2	Complete Sample Management Facility (SMF) Construction and Renovations	1.2.3.5.1.T	28 Jul 87	
P149 (P)	2	Begin Transfer of Existing Core From Core Library in Mercury to Sample Management Facility (SMF)	1.2.3.5.1.T	28 Jul 87	
P146 (P)	2	Begin Operational Tests of Sample Management Facility Curatorial Sample Inventory Tracking System	1.2.3.5.1.T	11 Aug 87	
P150 (P)	2	Begin Operational Tests of Sample Management Facility (SMF)	1.2.3.5.1.T	11 Aug 87	
P145 (P)	2	Complete Sample Management Facility (SMF) Equipment Procurement	1.2.3.5.1.T	25 Aug 87	

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MILESTONE	LEVEL	MILESTONE DESCRIPTION	WBS	NVO PLANNED	HQ PLANNED
P026 (B)	2	Quarterly Meteorological Monitoring Report 1	1.2.3.6.1.T	30 May 86	
P027 (B)	2	Quarterly Meteorological Monitoring Report 2	1.2.3.6.1.T	30 Jul 86	
P028 (B)	2	Quarterly Meteorological Monitoring Report 3	1.2.3.6.1.T	26 Sep 86	
R136 (P)	2	Submit Annual Report on Meteorological Monitoring Data(FY 86) to WMPO/NV	1.2.3.6.1.T	30 Jan 87	
R163 (P)	2	Submit Quarterly Meteorological Monitoring Report 4 (Oct-Dec 86) to WMPO/NV	1.2.3.6.1.T	30 Jan 87	
M897 (B)	1	Final Radiological Monitoring Plan Complete	1.2.3.6.1.T	31 Jan 87	28 Feb 86
R326 (P)	2	Submit Draft Air Quality Monitoring Plan to WMPO/NV	1.2.3.6.1.T	14 Feb 87	
R327 (P)	1	Submit Air Quality Monitoring Plan to DOE/HQ	1.2.3.6.1.T	15 Apr 87	29 May 87
R164 (P)	2	Submit Quarterly Meteorological Monitoring Report 5 (Jan-Mar 87) to WMPO/NV	1.2.3.6.1.T	30 Apr 87	
R328 (P)	2	Complete Agency Review on Air Quality Monitoring Plan	1.2.3.6.1.T	19 May 87	
N360 (P)	2	Submit Radiation Monitoring Data Summary Report to WMPO/NV	1.2.3.6.1.T	31 May 87	
R165 (P)	2	Submit Quarterly Meteorological Monitoring Report 6 (Apr-Jun 87) to WMPO/NV	1.2.3.6.1.T	30 Aug 87	
N320 (B)	2	Final Transportation Plan (TSP) and Resource Estimation	1.2.3.6.2.T	30 Mar 86	
N324 (B)	2	Update Transporation Scientific Inv Plan	1.2.3.6.2.T	30 Sep 86	
N334 (B)	2	Draft Community Profiles Report	1.2.3.7.T	31 Mar 86	
N312 (B)	2	Socioeconomic Studies Plan Update	1.2.3.7.T	30 Apr 86	
N247 (B)	2	Draft Tourism Study Plan	1.2.3.7.T	30 May 86	
N248 (B)	2	Final Tourism Study Plan	1.2.3.7.T	30 Jun 86	
P029 (B)	1	Draft Socioeconomic Monitoring and Mitigation Plan	1.2.3.7.T	30 Jun 86	30 Jun 86
P030 (B)	2	Final Socioeconomic Monitoring and Mitigation Plan	1.2.3.7.T	26 Sep 86	
N249 (B)	2	Annual [illegible] Data Report	1.2.3.7.T	30 Sep 86	
N372 (B)	2	Annual Demographic Data Report	1.2.3.7.T	30 Sep 86	
N373 (B)	2	Annual Economic Data Report	1.2.3.7.T	30 Sep 86	
N374 (B)	2	Annual Sociological Data Report	1.2.3.7.T	30 Sep 86	
R945 (P)	2	Submit Working Draft Site Characterization Socioeconomic Monitoring and Mitigation Plan	1.2.3.7.T	20 Nov 86	
N250 (P)	2	Submit Annual Tourism Data Report to WMPO/NV	1.2.3.7.T	30 Sep 87	
N375 (P)	2	Submit Annual Demographic Data Report to WMPO/NV	1.2.3.7.T	30 Sep 87	
N376 (P)	2	Submit Annual Economic Data Report to WMPO/NV	1.2.3.7.T	30 Sep 87	
N377 (P)	2	Submit Annual Social Characteristics Data Report to WMPO/NV	1.2.3.7.T	30 Sep 87	
R944 (P)	2	Submit Community Services Data Annual Report to WMPO/NV	1.2.3.7.T	30 Sep 87	
P031 (B)	2	MIS System Scope and Design Criteria Recommended to WMPO/NV	1.2.5.2.1.T	01 Dec 85	
M781 (B)	2	Joint NRC/DOE Position Established on Analysis of Seismic and Tectonic Environment for the NNWSI Project	1.2.5.2.1.T	03 Dec 85	
P303 (B)	2	Quarterly Licensing Status Report Issued to WMPO/NV	1.2.5.2.1.T	13 Mar 86	

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MILESTONE	LEVEL	MILESTONE DESCRIPTION	WBS	NVO PLANNED	HQ PLANNED
P036 (B)	2	Regulatory Compliance and Licensing Participant Briefing Package to WMPO/NV for Review and Approval	1.2.5.2.1.T	31 Mar 86	
M789 (B)	2	Information Management System (IMS) Phase I Complete (Concept Ev[illegible] Issued)	1.2.5.2.1.T	30 Apr 86	
P037 (B)	2	Start Regulatory Compliance Licensing Indoctrinations at Participant Locations (five presentations)	1.2.5.2.1.T	01 May 86	
P302 (B)	2	Issue Regulatory Document Manual to WMPO/NV and Project Participants with Updates as Required	1.2.5.2.1.T	11 May 86	
P035 (B)	2	Final Regulatory Compliance Plan Issued to Participants	1.2.5.2.1.T	20 May 86	
P304 (B)	2	Quarterly Licensing Status Report Issued to WMPO/NV	1.2.5.2.1.T	13 Jul 86	
M562 (B)	2	NRC Interaction Administrative Procedures Revised and Approved for Issue	1.2.5.2.1.T	15 Jul 86	
M790 (B)	2	NRC Issues on Exploratory Shaft Design and Construction Resolved and Documented	1.2.5.2.1.T	31 Jul 86	
P038 (B)	2	Complete Regulatory Compliance Licensing Indoctrinations at Participant Locations	1.2.5.2.1.T	31 Aug 86	
R132 (P)	2	Review and Comment on the Exploratory Shaft Test Plan (ESTP)	1.2.5.2.1.T	30 Sep 86	
R966 (B)	2	Revised Draft Regulatory Compliance Plan	1.2.5.2.1.T	01 Nov 86	
M556 (B)	2	Draft Site Characterization Plan (SCP) Chapter 8 Section 8.7 Complete	1.2.5.2.2.T	09 May 86	
M560 (B)	2	Draft Site Characterization Plan (SCP) Chapter 1 Complete	1.2.5.2.2.T	03 Jul 86	
M561 (B)	2	Draft Site Characterization Plan (SCP) Chapter 3 Complete	1.2.5.2.2.T	03 Jul 86	
P115 (B)	2	Draft Site Characterization Plan (SCP) Chapter 4 Complete (2nd)	1.2.5.2.2.T	01 Aug 86	
M559 (B)	2	Draft Site Characterization Plan (SCP) Chapter 8 Section 8.2 Complete	1.2.5.2.2.T	08 Aug 86	
M547 (B)	2	Draft Site Characterization Plan (SCP) Chapter 8 Section 8.5 Complete	1.2.5.2.2.T	15 Aug 86	
M591 (B)	2	Draft Site Characterization Plan (SCP) Chapter 8 - Subsection 8.3.1 Complete	1.2.5.2.2.T	15 Aug 86	
P054 (B)	1	Revised Camera-Ready Environmental Assessment/Comment Response Appendix (EA/CRA)	1.2.5.3.1.T	09 Apr 86	09 Apr 86
M598 (B)	2	Preliminary Scoping Report Complete	1.2.5.3.2.T	19 Jul 86	
N560 (B)	2	Final Environmental Impact Statement (EIS) Scoping Report Complete	1.2.5.3.2.T	07 Sep 86	
M569 (B)	2	Draft Preliminary Environmental Impact Statement (EIS) Management Plan Complete	1.2.5.3.2.T	30 Sep 86	
N316 (B)	2	Draft Environmental Permitting Plan	1.2.5.3.3.T	11 Nov 85	
N317 (B)	2	Final Environmental Permitting Plan	1.2.5.3.3.T	15 May 86	

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MILESTONE	LEVEL	MILESTONE DESCRIPTION	WBS	NVO PLANNED	HQ PLANNED
P019 (B)	2	Air Permit Application for Review and Application Submitted to WMPO/NV for Review and Approval	1.2.5.3.3.T	14 Jun 86	
P020 (B)	2	State Historical Preservation Office Documents Submitted to WMPO	1.2.5.3.3.T	14 Jun 86	
P021 (B)	2	U.S. Fish and Wildlife Service Permitting Information to WMPO/NV for Review	1.2.5.3.3.T	14 Jun 86	
P022 (B)	2	Bureau of Land Management(BLM) Permitting Information to WMPO/NV for Review	1.2.5.3.3.T	14 Jun 86	
P023 (B)	2	Water System Permit Application Information to WMPO/NV for Review	1.2.5.3.3.T	14 Jun 86	
P024 (B)	2	NV DepthWater Quality Permit Information to WMPO/NV for Review	1.2.5.3.3.T	14 Jun 86	
N304 (B)	2	Draft Environmental Program Plan	1.2.5.3.3.T	01 Aug 86	
N306 (P)	2	Final Environmental Program Plan	1.2.5.3.3.T	30 Jul 87	
P033 (B)	2	Draft Environmental Monitoring and Mitigation Plan (EMMP)	1.2.5.3.4.T	27 Jun 86	
P034 (B)	2	Environmental Monitoring and Mitigation Plan (EMMP)	1.2.5.3.4.T	26 Sep 86	
N310 (P)	2	Submit Environmental Monitoring and Mitigation Update & Data Report 1 to WMPO/NV	1.2.5.3.4.T	30 Aug 87	
R996 (P)	2	Submit Working Draft Environmental Monitoring and Mitigation Plan (EMMP) to WMPO/NV	1.2.5.3.4.X	21 Nov 86	
P310 (B)	2	Draft NNWSI Project Outreach and Participation Plan	1.2.5.4.1.T	30 Sep 86	
R997 (P)	2	Revision of Draft NNWSI Outreach & Participation Plan	1.2.5.4.1.T	30 Sep 87	
R998 (P)	1	Initiate Activities with BLM to Resolve Conflicts with Regard to Land Access	1.2.8.1.T	30 Nov 86	28 Feb 87
P058 (B)	1	Agenda for Project Managers meeting in Washington, D.C. on January 30, 1986	1.2.9.1.1.T	14 Jan 86	14 Jan 86
P056 (B)	1	Information Services Directory - Review and Comment	1.2.9.1.1.T	22 Jan 86	22 Jan 86
R402 (P)	2	Update Project Work Plans/NNWSI Project Management Plan	1.2.9.1.1.T	15 Feb 87	
R405 (P)	2	Draft NNWSI Project Administrative Procedures Manual Submitted to WMPO	1.2.9.1.1.T	30 May 87	
R407 (P)	2	Draft NNWSI Project Exploratory Shaft Management Plan Revision 5 Submitted to WMPO	1.2.9.1.1.T	30 Jun 87	
R039 (P)	2	Update NNWSI Project Work Plans	1.2.9.1.1.T	15 Jul 87	
R406 (P)	2	Draft NNWSI Project Management Plan Revision Submitted to WMPO	1.2.9.1.1.T	31 Aug 87	
R042 (P)	2	NNWSI F[illegible] Work Plans (FY 89-93) to WMPO/NV and DOE	1.2.9.1.1.T	30 Sep 87	
R409 (P)	2	NNWSI [illegible] Management Plan Approved	1.2.9.1.1.T	30 Sep 87	

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MILESTONE	LEVEL	MILESTONE DESCRIPTION	WBS	NVO PLANNED	HQ PLANNED
M855 (B)	1	Issue IMS Requirement Study to WMPO/NV for Review and Comment	1.2.9.1.4.T	30 Sep 86	30 Sep 86
M720 (B)	1	Impleme[illegible] Phase I of Earned Value System (80 percent level of effi[illegible]	1.2.9.2.T	31 Oct 85	30 Nov 85
M721 (B)	2	Project Milestones Baselined	1.2.9.2.T	31 Oct 85	
M722 (B)	1	FY 86 Project Budget Baseline Approved	1.2.9.2.T	31 Oct 85	31 Oct 85
M893 (B)	1	List of Project Office Controlled Milestones Complete	1.2.9.2.T	31 Dec 85	31 Dec 85
M723 (B)	2	Phase II Earned Value System Summary Documentation Complete and All Technical Project Officers and Cost Account Manager's Trained	1.2.9.2.T	30 Sep 86	
M725 (P)	1	Implement Phase II of Earned Value System	1.2.9.2.T	30 Nov 86	31 Jan 87
R854 (P)	2	Cost Account Manager Training Complete	1.2.9.2.T	15 Jan 87	
R990 (P)	2	Complete FY 87 WMPO/NV Audits	1.2.9.3.3.T	30 Sep 87	
R991 (P)	2	Complete FY 87 WMPO/NV Surveillances	1.2.9.3.4.T	30 Sep 87	
R992 (P)	2	Submit Draft NNWSI Project Procedure Quality Assurance Requirements for Computer Auxiliary Software to WMPO/NV	1.2.9.3.7.T	30 Jan 87	
M908 (B)	2	Issue Annual QA Report to WMPO/NV for the T&MSS Contractor	1.2.9.3.T	31 Oct 85	
M934 (B)	2	Records Management Procedure (SOP-17-01)	1.2.9.3.T	31 Oct 85	
M973 (B)	2	Recommmended Tentative Surveillance Schedule	1.2.9.3.T	31 Oct 85	
M979 (B)	2	Recommended Tentative Audit Schedule	1.2.9.3.T	31 Oct 85	
M984 (B)	2	Annual Status Report of NNWSI Project QA Program	1.2.9.3.T	31 Oct 85	
M750 (B)	2	NNWSI Project Procedure "Acceptance of Data or Data Interpretations Not Developed Under the NNWSI QA Plan " - Full Implementation	1.2.9.3.T	28 Feb 86	
M751 (B)	2	Draft NNWSI Project SOP-QA Requirements for Computer Software - Complete	1.2.9.3.T	30 Apr 86	
M752 (B)	2	NNWSI Project Quality Assurance Plan Update	1.2.9.3.T	30 Apr 86	
M753 (B)	2	WMPO/NV QA Program Plan and Procedures Update	1.2.9.3.T	31 Jul 86	
M755 (B)	2	FY 86 QA Audits of the Project Participants Completed in Accordance with the Approved Schedule	1.2.9.3.T	30 Sep 86	
M756 (B)	2	Completion of WMPO FY 86 Surveillances per Approved Schedule	1.2.9.3.T	30 Sep 86	
M757 (B)	2	Completion of the Installation of the QA Records Management System	1.2.9.3.T	30 Sep 86	
R677 (P)	2	Issue Annual T&MSS Quality Assurance Report to WMPO/NV	1.2.9.3.T	30 Oct 86	
R189 (P)	2	Issue Revised WMPO QAPP and QMP	1.2.9.3.T	21 Nov 86	

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MILESTONE	LEVEL	MILESTONE DESCRIPTION	WBS	NVO PLANNED	HQ PLANNED
SNL					
R108 (P)	1	Letter Report on Performance Allocation in the Site Characterization Plan (SCP)	1.2.1.1.1.S	31 Oct 86	30 Nov 86
R109 (P)	1	Letter [illegible] Coupled Processes for the Site Characterization Plan [illegible]	1.2.1.1.1.S	31 Oct 86	28 Nov 86
M870 (B)	1	Annual PASS Program Interaction - (Letter Report)	1.2.1.1.S	30 Aug 86	30 Sep 86
N113 (B)	2	Initial Performance Assessment Plan, Volume 1: Postclosure	1.2.1.1.S	15 Sep 87	
P126 (B)	2	System Studies Register	1.2.1.2.2.S	29 Aug 86	
R057 (P)	2	Preliminary Assessment of the Conditions of Criticality at the Prospective Yucca Mountain Repository	1.2.1.2.2.S	31 Jan 87	
R090 (P)	2	Summary Report of Data-Base Interactions Among NNWSI Participants	1.2.1.3.1.S	20 Aug 87	
R091 (P)	2	Initial 3-D Reference Stratigraphic Model for the Area within the Accessible Environment of the NNWSI	1.2.1.3.2.S	16 Mar 87	
R092 (P)	1	Annual Report on the NNWSI Project Reference Information Base	1.2.1.3.3.S	16 Mar 87	16 Apr 86
N117 (B)	2	Updated Concepts of Flow in Fractured, Unsaturated Tuff	1.2.1.4.1.S	04 Apr 86	
R110 (P)	2	Letter Report on the Strategy for Validating methods used to Study Near-Field Processes	1.2.1.4.2.S	26 Nov 86	
R026 (P)	2	SAND Report COVE 3 Benchmarking	1.2.1.4.2.S	27 Feb 87	
N448 (B)	2	Preliminary Validation of Subsurface Conditions for Repository Surface Facilities	1.2.3.2.1.1.S	30 Jun 86	
M806 (B)	1	Assistance to HEDL in Defining Remote/Automated Waste Handling Systems	1.2.4.1.1.S	15 Oct 85	31 Oct 85
N447 (B)	2	Plan for Bow Ridge and Other Fault Characterization	1.2.4.1.1.S	31 Dec 85	
N425 (B)	2	Initiate License Application Design Architect-Engineer (A-E) Selection	1.2.4.1.1.S	30 Mar 86	

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MILESTONE	LEVEL	MILESTONE DESCRIPTION	WBS	NVO PLANNED	HQ PLANNED
N430 (B)	1	Start Repository Advanced Conceptual Design	1.2.4.1.1.S	30 Jun 86	30 Jun 86
M802 (B)	1	Review of the Concepts Developed by HEDL for Remote/Automated Waste Handling Systems Initiated	1.2.4.1.1.S	30 Jul 86	30 Jul 86
N433 (B)	1	Initial Subsystem Design Requirement (SDR)	1.2.4.1.2.S	30 Nov 85	31 Jan 86
N416 (B)	2	NRC Repository Design Workshop for Seismic Tectonics - Seismic Study	1.2.4.1.3.S	15 Dec 85	
N426 (B)	2	Submit Annotated Outline for Advanced Conceptual Design (ACD)-Conceptual Design Report (CDR) to WMPO/NV for Review	1.2.4.1.3.S	30 Sep 86	
N432 (B)	1	Repository Conceptual Design in Support of Site Characterization	1.2.4.1.3.S	03 Nov 86	03 Dec 86
N434 (B)	2	Repository Design Plan	1.2.4.1.4.S	31 Mar 86	
N444 (B)	2	G-Tunnel Small Diameter Heater Experiments	1.2.4.2.1.2.S	30 Apr 86	
N403 (B)	2	Recommended Matrix Properties of Yucca Mountain Tuffs	1.2.4.2.1.3.S	30 Jun 86	
N429 (B)	2	Parameter effects on mechanical properties of the Topopah Spring tuffs	1.2.4.2.1.3.S	30 Jun 86	
N496 (B)	2	Report on Properties of Fractures-in the Topopah Spring Member	1.2.4.2.1.3.S	30 Sep 86	
N498 (B)	2	Report on Mercury Intrusion Results for Tuffaceous Materials from Yucca Mountain	1.2.4.2.1.4.S	28 Jun 86	
N427 (B)	2	Initiate Procurement of Development Prototype Boring Machine	1.2.4.2.2.1.S	14 Apr 86	
P131 (B)	2	Report on all Electrical Transporter for Waste at the Yucca Mountain Repository	1.2.4.2.2.1.S	30 Sep 86	
P404 (B)	1	Prepare Design Requirements and Materials Recommendation Report	1.2.4.2.3.1.S	29 May 86	30 Jul 86
R277 (P)	2	Preparee a Report on the Properties of a Tuff Concrete	1.2.4.2.3.2.S	02 Feb 87	
R278 (P)	2	Prepare a Report from the Results Obtained from the Interface Study	1.2.4.2.3.2.S	01 Apr 87	
R279 (P)	2	Development of a Degradation Model for Cementitious-Based Materials	1.2.4.2.3.2.S	01 Jun 87	
R280 (P)	2	Preparation of a Detailed Test Plan for Longevity Testing	1.2.4.2.3.2.S	01 Sep 87	

NEVADA NUCLEAR WASTE STORAGE INVESTIGATIONS
LEVEL 1 & 2 MILESTONES IN A TIME WINDOW OF 01 Oct 1985 TO 30 Sep 1987
Run Date: 11 November 1986
RESP: SNL

MILESTONE	LEVEL	MILESTONE DESCRIPTION	WBS	NVO PLANNED	HQ PLANNED
N428 (P)	2	Waste Handling Facilities Design Concepts	1.2.4.3.2.S	01 Mar 87	
P129 (B)	2	Report on the Welded Tuff Mining Demonstration Performed at the G-Tunnel Facility on the NTS	1.2.4.3.4.S	30 Sep 86	
P130 (B)	2	Report on Effect of Horizontal Borehole Length on Underground Emplacement Cost	1.2.4.3.4.S	30 Sep 86	
R287 (P)	2	Underground Construction Contingency Plan Report	1.2.4.3.4.S	01 Sep 87	
R288 (P)	2	Report on Cooling of Emplacement Drifts to Allow Re-Entry for Inspection, Repair, and Retrieval	1.2.4.3.5.S	01 Sep 87	
R289 (P)	2	Report on the Impact of In-Situ Radon on the Design of the Repository	1.2.4.3.5.S	01 Sep 87	
N242 (P)	2	Preliminary Repository Operations Plan	1.2.4.4.S	01 Apr 87	
N457 (B)	1	Preliminary Study of the Effects of Uncertain Geologic Data on Design of the Underground Facility	1.2.4.6.2.S	30 Jun 86	30 Aug 86
N413 (B)	2	Minimum Borehole Spacing	1.2.4.6.2.S	30 Sep 86	
R147 (P)	2	Preliminary Performance Comparison of Vertical and Horizontal Emplacement of Waste	1.2.4.6.2.S	31 Mar 87	
N458 (P)	2	Study of the Effects of Uncertainty in Geologic Data on Design Analysis of Underground Facility	1.2.4.6.2.S	30 Sep 87	
N463 (B)	2	System Requirements for Control of Exposure to Natural Radioactivity	1.2.4.6.3.S	30 Sep 86	
N464 (B)	2	Normal Conditions, Accidents and Source Terms for Preclosure Safety Analysis	1.2.4.6.3.S	30 Sep 86	
R196 (P)	2	SNL Department 6310 NNWSI Project Data Catalog	1.2.5.2.1.S	15 Oct 86	
R197 (P)	2	SNL Department 6310 NNWSI Project Data Catalog	1.2.5.2.1.S	15 Jan 87	
R198 (P)	2	SNL Department 6310 NNWSI Project Catalog	1.2.5.2.1.S	15 Apr 87	
R199 (P)	2	SNL Department 6310 NNWSI Project Data Catalog	1.2.5.2.1.S	15 Jul 87	
N125 (B)	2	Draft SCP Chapter 8 - Systems Requirements Portion Criteria	1.2.5.2.2.S	11 Apr 86	
P177 (P)	2	SNL Draft Text For SCP Section 8.3	1.2.5.2.2.S	20 Jun 86	
P176 (P)	2	Revised Draft Text For SCP Chapter 6	1.2.5.2.2.S	18 Jul 86	
P191 (P)	2	PIRC 6 First Review Meeting Conducted	1.2.5.2.2.S	13 Aug 86	
P172 (P)	2	PIRC Review Comments Submitted	1.2.5.2.2.S	19 Aug 86	

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LEVEL 1 & 2 MILESTONES IN A TIME WINDOW OF 01 Oct 1985 TO 30 Sep 1987
Run Date: 11 November 1986
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MILESTONE	LEVEL	MILESTONE DESCRIPTION	WBS	NVO PLANNED	HQ PLANNED
P173 (P)	2	SCP Chapter 2 Text Mark-up Completed	1.2.5.2.2.S	19 Aug 86	
P175 (P)	2	PIRC 2 Review Meeting Conducted	1.2.5.2.2.S	19 Aug 86	
P192 (P)	2	PIRC 3 Review Comments Submitted	1.2.5.2.2.S	19 Aug 86	
P194 (P)	2	PIRC 1 Review Meeting	1.2.5.2.2.S	20 Aug 86	
P193 (P)	2	PIRC 3 Review Meeting	1.2.5.2.2.S	28 Aug 86	
P174 (P)	2	PIRC 6 Second Review Meeting Conducted	1.2.5.2.2.S	29 Aug 86	
P179 (P)	2	PIRC 13 Review Comments Submitted	1.2.5.2.2.S	15 Sep 86	
P178 (P)	2	PIRC 13 Review Meeting	1.2.5.2.2.S	24 Sep 86	
P184 (P)	2	PIRC 12 First Review Meeting Conducted	1.2.5.2.2.S	26 Sep 86	
P190 (P)	2	SCP Chapter 6 Text Mark-up Completed For Sections 6.0-6.2	1.2.5.2.2.S	10 Oct 86	
P188 (P)	2	SCP Chapter 8 Text For PIRC 6 Design Sections Mark-up Completed	1.2.5.2.2.S	16 Oct 86	
P189 (P)	2	SCP Chapter 6 Text Mark-up Completed For Section 6.3 and 6.4	1.2.5.2.2.S	16 Oct 86	
P187 (P)	2	PIRC 7 Review Comments Submitted	1.2.5.2.2.S	17 Oct 86	
P183 (P)	2	PIRC 12 Second Review Meeting Conducted	1.2.5.2.2.S	24 Oct 86	
P182 (P)	2	Text MARK-up Completed For Performance Objective Issues	1.2.5.2.2.S	31 Oct 86	
P186 (P)	2	PIRC 8 Review Meeting Conducted	1.2.5.2.2.S	31 Oct 86	
P185 (P)	2	Text Mark-up Completed For Safety Related Sections	1.2.5.2.2.S	10 Nov 86	
P180 (P)	2	Technical Review Committee	1.2.5.2.2.S	31 Mar 87	
P181 (P)	2	PIRC 15 Integration Participation Completed	1.2.5.2.2.S	31 Mar 87	
R116 (P)	2	Input for the Test Plans Section of the SC Progress Report	1.2.5.2.2.S	04 Sep 87	
R118 (P)	2	Input for the Performance Assessment Section of the SC Progress Report	1.2.5.2.2.S	04 Sep 87	
R119 (P)	2	Input for Repository Design Section of SC Progress Report	1.2.5.2.2.S	04 Sep 87	
R114 (P)	2	Work Plan	1.2.9.1.1.S	15 Feb 87	
R115 (P)	2	WPAS Submitted	1.2.9.1.1.S	01 Mar 87	
R113 (P)	2	Contributions to the FY 87 NNWSI Project Mid-Year Review	1.2.9.1.1.S	30 May 87	
R972 (B)	2	Submit [illegible] Work Plans and QALAS to WMPO/NV	1.2.9.3.S	23 Jul 86	
R969 (B)	2	Submit [illegible] Plans and QALAS to WMPO/NV	1.2.9.3.S	29 Jul 86	
R971 (B)	2	Submit [illegible] Work Plans and QALAS to WMPO/NV	1.2.9.3.S	08 Aug 86	
R975 (B)	2	Submit Introduction and Sections 1.0, 5.0, 6.0, 8.0, 9.0, 11.0, 12.0, 13.0, and 14.0 of QAPP 86-0001 to WMPO/NV	1.2.9.3.S	22 Aug 86	
R970 (B)	2	Submit Modified Work Plans and QALAS to WMPO/NV	1.2.9.3.S	30 Sep 86	
R973 (B)	2	Submit Sections 4.0, 7.0, 10.0, 15.0, 16.0, 17.0, and 18.0 to QAPP 86-0001 to WMPO/NV	1.2.9.3.S	30 Sep 86	
R974 (B)	2	Submit Sections 2.0, and 3.0 of QAPP 86-0001 to WMPO/NV	1.2.9.3.S	30 Sep 86	

NEVADA NUCLEAR WASTE STORAGE INVESTIGATIONS
LEVEL 1 & 2 MILESTONES IN A TIME WINDOW OF 01 Oct 1985 TO 30 Sep 1987
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RESP: USGS

MILESTONE	LEVEL	MILESTONE DESCRIPTION	WBS	NVO PLANNED	HQ PLANNED
USGS					
P693 (P)	2	Issue Report: Preliminary Evaluation of Trench CF-2 & CF-3	1.2.3.2.3.1.G	30 Sep 87	
P106 (B)	2	Issue Report: Southern Great Basin (SGB) Ground Motion Attenuction	1.2.3.2.3.3.G	06 Dec 85	
P695 (P)	2	Issue Report: Discharge Study Amargosa Desert/Death Valley	1.2.3.3.3.G	17 Aug 87	
P696 (P)	2	Issue Report: Preliminary Estimate of Unsaturated Zone Flux at Yucca Mountain	1.2.3.3.4.G	28 Feb 87	
P697 (P)	2	Issue Report: Stochastic Model of Unsaturated Zone Subsurface Flow	1.2.3.3.4.G	30 Sep 87	
P698 (P)	[illegible]	Issue Report: Paleoenvironment of Yucca Mountain	1.2.3.3.5.2.G	30 Sep 87	
M558 (B)	2	Draft Site Characterization Plan (SCP) - Chapter 1 USGS Input	1.2.5.2.2.G	05 May 86	
M582 (B)	2	Draft Site Characterization Plan (SCP) Chapter 8 - USGS Input for Subsection 8.3.1	1.2.5.2.2.G	09 Jun 86	

NEVADA NUCLEAR WASTE STORAGE INVESTIGATIONS
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MILESTONE	LEVEL	MILESTONE DESCRIPTION	WBS	NVO PLANNED	HQ PLANNED
WMPO					
R888 (B)	1	Meeting on Feasibility of Using Copper in the Waste Package to be Held in Washington, D.C. on June 5, 1986	1.2.2.3.X	05 Jun 86	05 Jun 86
R227 (P)	1	Attendance at OGR Institutional/Socioeconomics Coordination Group Meeting	1.2.3.1.X	06 Feb 86	06 Feb 86
P055 (B)	1	Texas Bureau of Economic Geology (TBEG) Core Repository Literature Review and Comment	1.2.3.5.1.X	03 Jan 86	03 Jan 86
P139 (P)	2	Issue WMPO/NV Approval to Start Sample Management Facility (SMF) Procurement and Staffing	1.2.3.5.1.X	01 Dec 86	
R877 (B)	1	Letter from Lake H. Barrett to Loux Regarding Transportation Coordination Group (TCG) Meetings - Review and Comment	1.2.3.6.2.X	09 May 86	09 May 86
R870 (B)	1	Reference Package for the OGR Institutional/Socioeconomic Coordination Group Meeting in Washington, D.C. on May 20-22, 1986 — Review and Comment	1.2.3.7.X	05 May 85	05 May 86
M801 (B)	2	WMPO Provide Concepts of Remote/Automated Waste Handling Systems from HEDL	1.2.4.1.1.X	01 May 86	
N421 (P)	1	Recommended Candidate for License Application Design Architect/Engineer	1.2.4.1.1.X	31 Jul 87	31 Aug 87
R875 (B)	1	Site Characterization Plan (SCP) Issues Hierarchy - Review and Comment	1.2.5.2.2.X	23 May 86	23 May 86
R871 (B)	1	Last [illegible] Material Prepared in Draft Form for the Secretary's Briefing Book on the Environmental Assessments — Review and Comment	1.2.5.3.1.X	05 May 86	05 May 86
R898 (P)	1	Submit Working Draft Environmental Monitoring and Mitigation Plan (EMMP) to DOE/HQ	1.2.5.3.4.X	28 Nov 86	28 Nov 86

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MILESTONE	LEVEL	MILESTONE DESCRIPTION	WBS	NVO PLANNED	HQ PLANNED
P059 (B)	1	Draft Exploratory Shaft Facility (ESF) Cost Estimating Guidelines - Review and Comment	1.2.6.1.1.X	16 Dec 85	16 Dec 85
R296 (P)	2	NNWSI Project Administrative Procedures Manual Approved	1.2.9.1.1.X	15 Apr 86	
R192 (P)	2	Review & Approve NNWSI Project Work Plans (FY 86)	1.2.9.1.1.X	21 Apr 86	
R447 (P)	2	Draft NNWSI Project Management Plan-Review and Comment	1.2.9.1.1.X	30 May 86	
R887 (B)	1	Project Managers Meeting on June 4, 1986 in Washington, D.C.	1.2.9.1.1.X	04 Jun 86	04 Jun 86
R884 (B)	1	Meeting in Las Vegas on Project Office Information Management System on June 19-20, 1986	1.2.9.1.1.X	20 Jun 86	20 Jun 86
R849 (P)	1	Submit FY 87 Baseline Budget Information and Cost Plans to OGR for Information	1.2.9.1.1.X	31 Oct 86	30 Nov 86
R850 (P)	1	Approved Revised Project Charter	1.2.9.1.1.X	30 Nov 86	30 Jan 87
R403 (P)	2	Review/Approve Work Plans/NNWSI Project Management Plan	1.2.9.1.1.X	01 Mar 87	
R040 (P)	2	Review and Approve Draft NNWSI Project Work Plans	1.2.9.1.1.X	15 Mar 87	
R408 (P)	2	NNWSI Project Administrative Procedures Manual Approved	1.2.9.1.1.X	15 Apr 87	
R041 (P)	2	Final NNWSI Project Work Plans to SAIC for Revision	1.2.9.1.1.X	30 May 87	
R410 (P)	2	NNWSI Project Exploratory Shaft Management Plan Approved	1.2.9.1.1.X	31 May 87	
R229 (P)	1	Confirm attendance for Advanced Conceptual Design meeting scheduled for February 19-21 in Washington, D.C.	1.2.9.1.2.X	07 Feb 86	07 Feb 86
P057 (B)	1	Document entitled "Status of OCRWM Geological Disposal Technical Exchange Cooperation with Nations and International Agencies." - Review and Comment	1.2.9.1.2.X	01 Mar 86	01 Mar 86
M719 (B)	1	Submit FY 1988 Budget to DOE/HQ	1.2.9.1.2.X	21 Apr 86	21 Apr 86
R901 (B)	1	Furnish Comments or Corrections to Minutes of April 22-24, 1986, Quality Assurance Coordinating Group Meeting	1.2.9.1.2.X	24 Apr 86	24 Apr 86
R879 (B)	1	Letter to Loux from Barrett Regarding Transportation Coordination Group Meetings - Review and Comment	1.2.9.1.2.X	27 May 86	27 May 86
R865 (B)	1	Waste Package Coordination Group Meeting on June 11-12, 1986 in Columbus, Ohio	1.2.9.1.2.X	12 Jun 86	12 Jun 86
R886 (B)	1	MRB Ad Hoc Corrosion Review Panel/Repository Projects Meeting with NNWSI Project on June 18-19, 1986 in Las Vegas	1.2.9.1.2.X	19 Jun 86	19 Jun 86
R902 (G)	1	OGR Institutional/Socioeconomic Coordination Group Meeting on June 17-19, 1986 in St. Louis, Missouri	1.2.9.1.2.X	19 Jun 86	19 Jun 86
R878 (B)	1	PNL's Analysis on the Need for a Second Repository - Review and Comment	1.2.9.1.3.X	13 May 86	13 May 86
R869 (B)	1	Unsolicited Proposal: Characterization of Geologic Fractures Using Fractals and Graph Theory — Review and Comment	1.2.9.1.3.X	30 May 86	30 May 86
R889 (B)	1	Conference Call on June 4, 1986 with Office of General Counsel (OGC)	1.2.9.1.3.X	04 Jun 86	04 Jun 86
R888 (B)	1	Transmit Correspondence to Complete Listing on State Correspondence	1.2.9.1.3.X	18 Jun 86	18 Jun 86

NEVADA NUCLEAR WASTE STORAGE INVESTIGATIONS
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MILESTONE	LEVEL	MILESTONE DESCRIPTION	WBS	NVO PLANNED	HQ PLANNED
		Relating to Geologic Repository Activities Maintained by the Office of Policy and Outreach			
R874 (B)	1	OCRWM-Wide Financial Assistance Guidelines - Review and Comment	1.2.9.2.X	23 May 86	23 May 86
R876 (B)	1	Provide Projections of Obligations, Costs, and Payments in Support of OCRWM's Program Operating Plan (POP) Requirements as Outlined in DOE Order 2200.3	1.2.9.2.X	23 May 86	23 May 86
R872 (B)	1	Advise Steve Schneider, OCRWM, of the Definite Date For Completion of Draft Estimate of Repository Cost Based on the Site Characterization Plan (SCP) Design	1.2.9.2.X	26 May 86	26 May 86
R882 (B)	1	Submit Revisions to Letter from Vieth to Loux Concerning the Portion of the State's Grant Request that Addresses Independent Testing and Monitoring Activities	1.2.9.2.X	26 May 86	26 May 86
R881 (B)	1	Submit Operating Expenses and Capital Equipment Input for the July Approved Funding Program and Financial Information System Report	1.2.9.2.X	06 Jun 86	06 Jun 86
R883 (B)	1	Submit Estimate of Funding Requirements for Alternate Case to Support Preparation of the FY 1988 Budget	1.2.9.2.X	06 Jun 86	06 Jun 86
R873 (B)	1	Review Project Milestones in List Provided by Quality Assurance Coordinating Meeting and Advise HQ of Problems and Suggestions for Resolution	1.2.9.3.X	23 May 86	23 May 86

NEVADA NUCLEAR WASTE STORAGE INVESTIGATIONS
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MILESTONE	LEVEL	MILESTONE DESCRIPTION	WBS	NVO PLANNED	HQ PLANNED

NO MILESTONES IN THIS REPORT 299

Department of Energy
Chicago Operations Office
Salt Repository Project Office
505 King Avenue
Columbus, Ohio 43201-2693
Commercial (614) 424-5916
F.T.S. 976-5916

October 2, 1986

Barry G. Gale, Chief
Economic & Intergovernmental
  Analysis Branch, HQ
RW-252

SUBJECT: SRPO REVIEW OF FACILITY-SPECIFIC OUTREACH AND PARTICIPATION PLANS (FSOPP) REVIEW CRITERIA AND INSTITUTIONAL ACTIVITY CHECKLIST

As per discussions at the September 15-19, 1986 ISCG meeting in Denver CO, we are providing comments on the above material contained in the ISCG reference package. The package was received at too short of a time period to provide these comments before the meeting.

We appreciate the efforts of you and your staff to alert technical staff that the FSOPPs are required by the Mission Plan and the importance these plans will have to the successful conduct of site characterization activities. As you know, SRPO intends to develop the FSOPP through interactions with the affected publics. We encourage HQ participation in these interactions at every level. Once the FSOPP is drafted, however, it will greatly reduce DOE credibility and trust to have provisions agreed to reversed by another DOE office. The Activity Checklist implies a level of scrutiny that we feel is likely to result in such reversals. Additionally, we view the FSOPP as having a local focus, although there will be State participation throughout its development; State level issues will remain a part of C&C discussions/negotiations.

Therefore, as an alternative to developing specific review criteria, which may in the end not be in concert with the FSOPP, we would propose the following two steps:

- o Training for technical staff to heighten awareness of how public participation can be successfully implemented (we would be pleased to provide the services of the consultant who is working with our technical staff).

- OGR guidance in areas that are anticipated to be problematic or that are important in terms of equity across the three projects (those items noted on the Activities Checklist for which HQ policy is desired/needed, such as review times, access to preliminary information, site visits, availability of raw data, etc.) to bound the consultation process that will go on between the project offices and the affected publics.

I appreciate the opportunity to offer comments on this material and would be pleased to discuss them further with you or your staff. Please call me or Linda McClain if you have questions concerning these comments.

J.O. Neff

J.O. Neff
Project Manager
Salt Repository Project Office

SRPO:LKM:max:1399LP

cc: C. Peabody, DOE-HQ

IN# 572-86

Department of Energy
Washington, DC 20585

JAN - 9 1987

Mr. Robert R. Loux, Executive Director
Agency for Nuclear Projects
Nuclear Waste Project Office
Capitol Complex
Carson City, Nevada 89710

Dear Mr. Loux:

Thank you for your review of our Quality Assurance Plan and for the comments in your letter of December 4, 1986. We appreciate your careful review and your interest in our program. We are currently evaluating your comments to see what changes we can make to our QA program to strengthen and improve it.

At the Quality Assurance Coordinating Group Meeting, which is being held on January 29, 1987 in Las Vegas, we plan to address verbally the major comments you and the other States have made. We will also be happy to answer any questions you or your representatives may have and to discuss our response. A written response for each of the comments in your letter of December 4, 1986 will also be provided to you.

We have enclosed, for your information, a copy of the comments we received from the State of Texas and those from the State of Washington. We have not yet received comments from the Nuclear Regulatory Commission (NRC), but will supply you with a copy when we receive them. The NRC comments are expected shortly.

Thanks again for your review and comments. I look forward to seeing you at the QACG meeting.

Sincerely,

S. H. Kale
Stephen H. Kale
Associate Director for
Geologic Repositories

Enclosures:

ANDREA BEATTY RINIKER
Director

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY
Mail Stop PV-11 • Olympia, Washington 98504-8711 • (206) 459-6000

November 20, 1986

Ben Rusche, Director
Office of Civilian Radioactive
Waste Management
U.S. Department of Energy
1000 Independence Avenue
Washington, D.C. 20585

Dear Mr. Rusche:

The state of Washington appreciates the opportunity to comment on the Office of Civilian Radioactive Waste Management (OCRWM), Office of Geologic Repositories (OGR) "Quality Assurance Plan for High-Level Radioactive Waste Repositories". Earlier state of Washington comments on quality assurance issues were included as a part of our submittals on the Site Characterization Report, the General Guidelines for the Recommendation of Sites for Nuclear Repositories, the Mission Plan, and the Environmental Assessment. In each submittal we expressed concerns about the quality assurance function within the U.S. Department of Energy organization. In each submittal we expressed a concern about the lack of an adequate quality assurance program. Recent stop work orders at Hanford and Yucca Mountain again illustrated the need for a strong, independent, and accountable quality assurance programs.

It appears the writers of the currently issued version of the OGR Quality Assurance Plan were not aware of our earlier comments and comments made during Quality Assurance Coordinating Group (QAG) meetings. In our opinion, the current version must be revised to reflect our positions on several significant areas.

Our comments are divided into general comments on organization, accountability, independence, and matrix management, plus detailed comments on specific sections of the plan.

Previous state of Washington comments have emphasized the need for organizationally recognizing the importance of quality assurance. As a minimum, the OCRWM Quality Assurance Manager should report directly to the OCRWM Director, the OGR Quality Assurance Manager should report directly to the OGR Associate Director, and the each field site quality assurance manager should report directly to the field site project manager. Each quality assurance manager must be fully accountable for appropriate functions, be independent of project cost and schedule considerations, and report directly to one boss.

The OCRWM organization chart indicates the OCRWM QA Manager reporting directly (solid line) to the Office of Policy and Outreach Director, with an unexplained dotted line to the OCRWM Director. The OGR organization chart indicates the OGR QA Manager reports directly to the Licensing and QA Branch Chief, who reports to the Siting, Licensing and Quality Assurance Division Director, who reports to the OGR Associate Director, who reports to the OGR Associate Director. The chart shows unexplained dotted lines from the QA Manager to the OGR Associate Director and the OCRWM QA Manager. This leads one to conclude that the OGR QA Manager has three bosses. This is the classic case of matrix management, where the QA Manager does not report to one boss and cannot be accountable for the QA function. The person reporting directly to the OGR Associate Director has responsibility for siting and licensing, plus the quality assurance function. This person is, therefore, not independent of projects and costs and schedule.

Figure 3-3 shows the Basalt Site Richland Operations Office (BWIP) with program/project responsibilities and reporting directly to the Office of Geologic Repositories (headquarters). The Department of Energy Richland Operations Office shows the BWIP Project Manager reporting directly to the Richland Operations Manager. This is another example of the project manager working for two bosses. In the past, the BWIP Project Manager has been on extended "special assignments" for the Operations Office. On several occasions, the QA Manager temporarily sat in for the project manager while the project manager was on special assignment. During this period, the QA Manager was clearly responsible for BWIP costs and schedules. The Quality Assurance Plan must address this issue in more detail.

The OGR QA plan does not address the issues of how many USDOE QA persons should be on staff to oversee contractors. At Hanford there has been a unacceptable ratio of USDOE QA persons to contractor QA persons. USDOE is accountable for the quality of work and must provide an adequate number of USDOE quality assurance persons to ensure quality. Recent Hanford QA problems and the resulting stop work orders at Hanford illustrate the problem. The OGR QA plan should discuss this issue and the plan should specify an appropriate ratio.

Specific comments are as follows:

2.3.1 The Mission Plan should provide an informational basis sufficient to permit informed decisions, but recent USDOE decisions regarding a second repository have severely reduced the value of the document.

3.1 The statement that the "QA management functions responsibilities and authorities for OGR have been assigned by the Director, OCRWM to the Associate Director OGR" seems inconsistent with figure 3.1.

4.3.2.d The OGR QA Manager "overview" funding for QA activities and identified insufficient resources through the Licensing and QA Branch Chief through the SLQA Division Director to the Associate Director OGR. This appears to illustrate our concern about the level of QA personnel within the USDOE organization.

4.3.2.e.1 Project office QA plans and procedures should be submitted to the appropriate states and affected Indian tribes for their review and comment.

4.3.2.e.3 The appropriate state and affected Indian tribes should be invited to participate in project readiness reviews. The invitation should include early access to data.

4.3.2.f.6 Results of surveillance performed should also be reported to the appropriate states and affected Indian tribes.

4.6 OGR QA Supplement #6 should be changed to indicate that states and affected Indian tribes will be notified at the time significant quality problems are identified and again when resolved. Significant problem reporting and corrective action records are a significant part of the record for NRC licensing and as such should become permanent records.

5.3.1 The project QA plan and/or applicable QA administrative procedures should describe a process for review and comment by appropriate states and affected Indian tribes.

Appendix A - Quality Assurance Manual Evaluation-Handling, Storage and Shipping -- Requirements for control of samples from collection of the sample analysis should be established and documentation for control of each sample must be provided.

Supplemental QA Requirements - Supplement No. 11

1.0 Appropriations have been approved to begin preliminary design work on the Hanford Waste Vitrification Plant and criteria are being developed to determine which wastes should be vitrified. Both activities require an adequate QA program. The supplement should be amended at this time to include Hanford wastes.

Supplemental QA Requirements - Supplement No. 12

We question whether this supplement is appropriate. Arbitrarily limiting non-DOE observers to one observer during each audit cycle is contrary to the NWPA because the states, tribes and NRC have a statutory role which allows participation. USDOE should substitute a process whereby states, tribes and NRC are encouraged to cooperate on audits and the audit team is made up of the most highly qualified personnel.

Please contact me or Don Provost if you have questions.

Sincerely,

Terry Husseman, Director
Office of Nuclear Waste Management

TH:hlt

cc: Jim Knight
Carl Newton

DOE F 1325.8
2-84

United States Government | Department of Energy

memorandum

DATE FEB 0 2 1987

REPLY TO
ATTN OF RW-223

SUBJECT Review of Portland, Oregon, Quarterly Meeting Commitments and Highlights, and Review of Spokane, Washington, Quarterly Meeting Plans and Issues

TO Distribution

A meeting has been scheduled in Room 2E071 at 10:30 a.m., Wednesday, February 4, to review the Quarterly Meeting material from the Portland, Oregon, meeting and for the Spokane, Washington, meeting.

Attached are the commitments from the Portland meeting and their status.

Barry G. Gale, Chief
Economic and Intergovernmental
Analysis Branch
Office of Civilian Radioactive
Waste Management

Attachments

Distribution:

L. Barrett, RW-32
J. Bresee, RW-22
B. Easterling, RW-42
R. Gale, RW-40
T. Isaacs, RW-22
S. Kale, RW-20
G. King, RW-43
J. Knight, RW-24
J. Leahy, RW-223
B. Mussler, GC-11
C. Peabody, RW-223
S. Rousso, RW-10
J. Saltzman, RW-42
S. Smith, Weston
R. Stein, RW-23
M. Wisniewski, CP-23

United States Government Department of Energy

memorandum

DATE: SEP 12 1986

REPLY TO ATTN OF: RW-20

SUBJECT: Commitments and Meeting Highlights from the Quarterly Meeting of States and Indian Tribes Held in Portland, Oregon, August 13, 1986

TO: Distribution

Attached are the commitments and meeting highlights (Attachment A) from the August 13, 1986, Quarterly Meeting of States and Indian Tribes.

For several of the commitments, we can now provide a status report:

COMMITMENT NUMBER	
1	See Attachment B
3	See Attachment C
4	The Project Offices received the final Environmental Assessments (EAs) the first week of May. The decision documents (DOE/S-0048, the Secretary's recommendation document, and DOE/RW-0074, the methodology report) were received on May 23. The President approved the recommendation on May 27. DOE held a press conference and made the formal release of the final EAs and the decision documents on May 28, the same day the States and Indian Tribes were notified.
6	The next Transportation Coordination Group meeting will be held this Fall. Arrangements for the meeting are currently underway. No specific date has yet been set.
7	The OGR QA Plan, OGR/B-3, Revision 1, (DOE/RW-0095) dated August 1986, was sent to the State and Indian Tribe representatives on September 8, 1986.
9	The FY 1986 supplemental grant application from the Washington State Department of Ecology has been awarded for $110,000.
10	See Attachment D

14 The DOE HQ representative is Tom Isaacs and the Project Offices representative is Don Vieth.

Also attached is a letter we sent to the National Academy of Sciences (NAS) on July 25, 1986, and NAS's response of August 14, 1986, (see Attachment E).

If you have any questions or comments, please contact Barry Gale or Judy Leahy of my staff at 252-1116.

William J. Purcell
Associate Director for
Geologic Repositories
Office of Civilian Radioactive
Waste Management

Attachments

ATTACHMENT A

QUARTERLY MEETING OF STATES AND INDIAN TRIBES

Portland, Oregon

August 13, 1986

Meeting Highlights

CHAIRPERSON: Russell Jim, Yakima Indian Nation

PARTICIPANTS:

States and Indian Tribes

H. Hal Aronson, Yakima Indian Nation
Albert Barros, Nez Perce Indian Tribe
Warren Bishop, Washington State
Mary Lou Blazek, Oregon Department of Energy
Ginny Bronson, Umatilla Indian Reservation
William Burke, Umatilla Indian Reservation
Curtis Canard, CERT
Gail Chehak, NCAI
Sandra Crowe, Yakima Indian Nation
Bill Dixon, Oregon Department of Energy
Barbara Foster, NCSL
James Friloux, Louisiana
Steve Frishman, Texas
Kevin Gover, Nez Perce Indian Tribe
John Green, Mississippi
Candace Greene, Nez Perce Indian Tribe
Gary Greene, Nez Perce Indian Tribe
Ron Halfmoon, Nez Perce Indian Tribe
Michelle Henry, Nez Perce Indian Tribe
Daniel Hester, Umatilla Indian Reservation
Robert Holden, NCAI
James B. Hovis, Yakima Indian Nation
Nancy E. Hovis, Yakima Indian Nation
Terry Husseman, Washington State
John Hutchins, CERT
Elisabeth Jacobs, CRITFC
Bob Loux, Nevada
Sidney Martin, Mississippi
Reine Moffett, Nez Perce Indian Tribe
Mal Murphy, Nevada
Ralph Patt, Water Resources, Oregon
Henry Penney, Nez Perce Indian Tribe
Don Provost, Washington State
Wyatt Rogers, Jr., CERT
Cheryl Runyon, NCSL

Carl Sampson, Umatilla Indian Reservation
Cynthia Scott, Nez Perce Indian Tribe
William Spell, Louisiana
Lisa Spruill, Mississippi
Pat Spurgin, Utah
David Stevens, Yakima Indian Nation
Don Tahkeal, Yakima Indian Nation
Bob Taylor, BIA
Dean R. Townsley, Yakima Indian Nation
T.R. Webster, IHS Portland
Del T. White, Nez Perce Indian Tribe
Danae Wilson, Nez Perce Indian Tribe
Jack Wittman, Yakima Indian Nation
David Wolfe, Umatilla Indian Reservation
Bill Yallup, Jr., Yakima Indian Nation

U.S. Department of Energy

JoAnne Comins-Rick, BWIP
Barry Gale, HQ
Roger Gale, HQ
Ken Goodmiller, HQ, GAO
Tom Isaacs, HQ
Jim Knight, HQ
Judy Leahy, HQ
Linda McClain, SRPO
Jim Mecca, BWIP
Bob Mussler, HQ
Jeff Neff, SRPO
Lee Olson, BWIP
Max Powell, BWIP
William J. Purcell, HQ
Sam Rousso, HQ
Ralph Stein, HQ
Don Vieth, NNWSI
Mike Wisniewski, HQ

Nuclear Regulatory Commission

F.R. Cook
Alma Hale

Organizations

Madeline Brown, Rockwell
John Gervers, LATIR Energy Consultants
Steven P. Kraft, Edison Electric Institute
Lisa Stevenson, WESTON

PORTLAND MEETING COMMITMENTS

1. Continuation of Albuquerque #2: "DOE will provide to States and Indian Tribes copies of its annual planning guidance letters, if pertinent to site characterization (continuation of Atlanta commitment #7)."

2. Continuation of Albuquerque #3: "DOE will provide States and Indian Tribes with design requirements and design reports for project-specific advanced conceptual designs. The original anticipated date of May 1986 may slip (continuation of Denver commitment #3, with modification of delivery date.)"

3. DOE will make available copies of Secretary Herrington's letter to Governor Bangerter explaining EA release notification.

4. DOE will determine when the Project Offices received the EAs and decision documents and inform the States and Indian Tribes.

5. DOE will provide a minimum of 30 days advance notice, prior to a date certain, for release of the SCP for public hearings.

6. DOE will provide to States and Indian Tribes the schedule for the next Transportation Coordinating Group meeting.

7. HQ will provide control copies of QA plans to the States and Indian Tribes.

8. States and Indian Tribes will provide comments to DOE on the Financial Assistance Guidelines, including comments on eligibility for funding for participation in the NRC licensing process. DOE will deal with this issue specifically in the General Guidelines, which will be revised and available by September 15.

9. HQ, by August 20, will examine the status of the request by the State of Washington for using funds to review the methodology, as well as to conduct six other tasks, submitted in their memo of July 7.

10. DOE will contact the consultant to the NAS who wrote a letter to DOE disagreeing with the translation of the methodology to the final decision, for permission to send copies of that letter to the States and Indian Tribes.

11. DOE will approach NAS to encourage the involvement of States and Tribes in DOE/NAS meetings.

12. DOE will provide transcripts of the Udall hearing to the States and Indian Tribes.

13. DOE will brief the States of Nevada and Washington on the methodology and its application.

14. A planning subcommittee composed of Ron Halfmoon representing the three Indian Tribes, Terry Husseman representing the States, and two DOE representatives (one from HQ and one representing the Project Offices, TBD next week) will meet to structure a model for future quarterly meetings that will be open to the public. They will prepare a proposal in writing, to be forwarded to affected parties by October 1.

REVIEW OF ALBUQUERQUE COMMITMENTS

~~The~~ commitments made at the April Quarterly meeting in Albuquerque were reviewed. (See page 11 for a summary of their status.)

There was considerable discussion concerning commitment number 5:

> "DOE will convey to the Secretary, the States and Indian Tribes request that the Environmental Assessments (EAs) not be released without a 30-day advance notice to States and Indian Tribes, specifying the exact release date. When the EA release date is announced, DOE will also provide States and Indian Tribes a description of all documents to be released with the EAs, and to the extent possible, with key decision dates in the process."

The States and Indian Tribes expressed strong dissatisfaction with the fact that they did not receive advance notice about the release of the EAs and the nomination and recommendation decision. They went on to say that DOE had made a commitment to provide at least two weeks notice, and preferably 30 days notice, and that the Department failed to meet either of those commitments.

DOE replied that they did convey the States and Indian Tribes' request to senior DOE management. However, ultimately the nature and timing of the decisions by senior Department officials were such that date-certain advance notice was not possible. The OCRWM program staff were informed only on the morning of the announcements, and then began immediately to call affected parties to notify them. Because OCRWM itself received such short notice, there was no time to prepare a Briefing Book to accompany the Congressional briefing that was held the next day.

PORTLAND MEETING HIGHLIGHTS

Financial Assistance

Headquarters explained the difference between the two sets of draft financial assistance guidelines that were provided in the meeting reference package. The Office of Civilian Radioactive Waste Management...Policy Guidelines, July 1986, are umbrella guidelines that deal with all aspects of the program, including the MRS if it is approved by Congress. The purpose of these guidelines includes clarifying differences among grants, contracts, and cooperative agreements; defining affected parties for purposes of establishing eligibility for financial assistance; clarifying the decisionmaking process to establish procedures for timely resolution of issues; and defining activities which are ineligible for funding.

The Repository Program Guidelines are more specific and provide more detail on procedural issues. They were originally issued on June 24, 1983; revised and reissued on September 7, 1984; and supplemented by means of a February 4, 1986, memorandum from Ben Rusche to the DOE Operations Offices, dealing with the implications of the Nevada lawsuit. The 1984 Guidelines plus the Rusche memo are what are currently being used to evaluate grant proposals.

The draft Repository Guidelines in the reference package for this meeting ("Internal General Guidelines for Implementing Financial Assistance (Grants) for Repository Programs...August 1, 1986") incorporate the Rusche memorandum into the 1984 Guidelines, and also contain the following major areas of revision:

4.4 Criteria for funding independent data collection and studies and allowability of funding of the MRS, defense waste and transportation as they relate to repository development; and

6.1 Guidance for phase-down funding for States nominated, but not recommended.

The States and Indian Tribes asked who will determine whether a planned activity by the States and Indian Tribes is appropriate in the sense that it constitutes an "overview" of the program and by what standard will DOE judge the adequacy of the quality of the proposed activity. DOE said that the DOE program must be the reference point, and that State and Indian Tribal proposals should reflect a good understanding of what DOE proposes to do.

The States and Indian Tribes commented that the issue is whether the data that they collect will be usable in a licensing proceeding. They expressed concern that DOE would deny funds to collect data based on an a priori judgement that the data collected will be of poor quality, and said that the quality of the data should be "our problem" when we present the data to the NRC. DOE agreed, but indicated that poor data might be an issue during a hearing.

The States and Indian Tribes asked whether their participation in the NRC licensing process will be an activity which is fundable. DOE said that the decision as to who is an intervenor and who has standing is up to NRC. However, DOE intends to continue funding to affected parties during the licensing process.

The schedule for issuing final financial guidelines is as follows: DOE will try to revise the Policy Guidelines by August 22, and send the revision to the States and Indian Tribes for review and comment. The Policy Guidelines will be sent as a package with the draft Repository Guidelines, and both will be on the agenda for discussion at the September 16-18 Institutional Socioeconomic Coordination Group (ISCG) meeting in Denver. Subsequent to the ISCG meeting, both Guidelines will be issued in final form.

Defense Waste

The States and Indian Tribes asked when the allocation between defense and the ratepayers' contributions is going to occur. DOE replied that a Federal Register Notice (FRN) describing three methodologies for determining the fair share of allocation costs will be published in about a month. The FRN will propose three alternative formulas for determining the amount that would be paid by Defense Programs (DP), each of which would be applicable to any quantity of waste. The FRN will include two hypothetical examples of cost allocations based on assumed amounts of civilian and defense wastes in two assumed pairs of repositories. The public comment period will last 45-60 days, during which comments will be requested about the formulas.

After the comments are evaluated, DOE will propose a formula which will serve as the basis to satisfy the requirement under Section 8, to determine an allocation approach. Congress then has to act on the formula, and also will decide on the timing and form that such funding would take. DOE would then work with the Office of Management and Budget to implement the formula. The formula concept will not preclude DOE from requesting money from the Federal treasury to pay for defense waste in the short run; however, the earliest that such a request could be made is in the DP '88 budget request, since it is not in the '87 budget, nor is it in the OCRWM '88 budget request.

The States and Indian Tribes also asked how much defense waste will be stored at Hanford, in view of the suspension of the second repository program. DOE replied that once the amount of waste in the first repository has reached 70,000 metric tons, a second repository must be opened before additional waste may be stored in the first. The schedule in the Mission Plan still applies. It is the flow rate that determines the timing need for a second repository, not the volume of defense waste or the contents of the waste in the first repository.

The FRN deals with two repositories, because it is likely that the 70,000 metric ton limit will be exceeded. What is not certain is when that will occur. The current estimate is that it will be about the year 2020, in which case the mid-1990s is when site-specific activity on a second repository will need to resume in earnest. The Department does not have any plans to recommend removing the 70,000 metric ton cap on the first repository required by the NWPA.

Licensing Support System

DOE presented a status report on the Licensing Support System (LSS). DOE is preparing to contract for LSS design and implementation. A procurement package containing a statement of work, procurement forms, evaluation criteria, and instructions to offerors has been sent to the Department's procurement office, and a Request for Proposals (RFP) is currently being prepared. DOE expects the RFP to be issued about September and a contract award to be made in early 1987.

DOE is also developing LSS administrative specifications and procedures. Those that have been prepared and are currently in internal review are: record collection and storage specifications; record collection procedures for OGR/HQ; record storage and retrieval procedures for OGR/HQ; issue tracking procedures; and commitment tracking procedures. DOE expects the internal review to be completed about the end of August. Then, in September, the documents will be given to NRC, the States, and Indian Tribes for review, and will be discussed at a meeting of the Interagency Coordinating Group Committee about a month later.

The States and Indian Tribes asked about the relationship between the above activities and the NRC Part 2 changes. DOE said that the LSS is independent and is a pivotal information storage and retrieval system for the program. However, DOE is attempting to design the system to meet the needs of the licensing process. While the complexity of the system requires that development begin prior to a final NRC rule being in place, DOE will modify the system if needed, to comply with NRC licensing requirements.

With respect to participation by affected parties, DOE emphasized that there is an expectation of participation. Announcements of Interagency Coordinating Group meetings are sent to all States and Indian Tribes and the expectation is that they will participate. DOE is also trying to avoid overlapping meetings and schedule conflicts by maintaining a meeting board at Headquarters, which is consulted when setting up meetings.

Site Characterization

The States and Indian Tribes asked whether the program is in the site characterization phase (as opposed to a site investigation phase — a term used at the recent Quality Assurance Coordinating Group meeting), and, if so, indicated that a Site Characterization Plan (SCP) is required before activities may take place. DOE confirmed that this is the site characterization phase, but said that the availability of an SCP only applies to the sinking of an exploratory shaft and other specific activities contained in the NWPA. DOE is in the process of preparing for information a 15-20 page summary document that will describe the activities that are currently going on at the Federal sites and then will be sent to States and Indian Tribes. The BWIP and Nevada Project Offices have submitted their documents to Headquarters, and the review is expected to be completed in about two weeks. The process of preparing these documents has taken longer than expected, because in certain cases it has been difficult to determine whether an activity is ongoing or new work.

The States and Indian Tribes said that they need to know not only what is going on now, but also what is planned for the future. From their perspective, it is important to understand the entire array of tests, and they want to see all material related to a study area. DOE said that the distinction between ongoing and new activities is important because DOE-NRC agreements with respect to the SCP require that lengthy detailed study plans be prepared for all new work. DOE agreed to provide copies of all completed plans pertaining to on-going work when it issues the 15-20 page summary document.

Quality Assurance

A quality assurance plan was issued in March, and copies were sent to the States and Indian Tribes. In response to a State and Indian Tribe request, DOE also agreed to provide controlled copies of revised quality assurance plans to the States and Indian Tribes in the near future. This will ensure their receipt of revisions. The States and Indian Tribes questioned whether it was appropriate that at BWIP, the Hanford quality assurance staff person occasionally sits in for the project manager. DOE replied that although it had been discussed with NRC, at this stage of the program, the Department has the authority to determine its own organizational arrangements. DOE went on to say that it was confident that the OCRWM QA program will be in place to assure that the data necessary to the licensing process will be fully qualified. DOE also noted that the acceptability of data taken in the past must be evaluated on a case-by-case basis, with each case judged individually.

Impact of Gas Exploration on Resources at Hanford

Bill Lynley, from the Washington State Department of Natural Resources, made a presentation on current drilling activity in the vicinity of the Hanford Reservation. He indicated that recent findings indicate that the area around Hanford shows good potential for oil and gas generation. Mr. Lynley's office is attempting to evaluate the potential that drilling activity might - occur on the repository site in the future, if and when records pertaining to the repository are no longer available.

OCRWM PROGRAM UPDATE

Appropriations Committee Action

The States and Indian Tribes announced at the meeting that the Senate Appropriations Committee had just passed a DOE appropriations bill providing $380 million for FY87. When asked by the States and Indian Tribes to comment, DOE expressed disappointment, and indicated that they were not able to say yet what the impact will be, should the bill be passed by both houses of Congress and signed into law.

OCRWM Organization

Headquarters explained the OCRWM and OGR organizational charts and provided the names of the incumbents in each position. Headquarters also announced that an RFP for cask development was issued and that the Transportation Institutional Plan will be released soon.

National Academy of Sciences

With respect to the National Academy of Sciences (NAS), Headquarters said that they have contacted NAS about possibly using them in an oversight role for some of the site characterization work. In the discussion that followed, the States and Indian Tribes asked that since NAS had given a favorable opinion on the methodology and its application, doesn't NAS have a vested interest in the decision, and thus they questioned the Academy's appropriateness for future independent peer review.

DOE said that they were aware of no member and only one consultant of the NAS board who had expressed some mild reservations regarding the application of the methodology in selecting the three sites for recommendation, and that a consultant to the Board had written a letter to DOE expressing disagreement with the translation from the methodology to the final decision. DOE emphasized that the methodology was decision-aiding, not decision-making, and thus NAS has no stake in the final decision. DOE also observed that the concerns that the States and Indian Tribes have expressed are directed more to NAS than to DOE and perhaps should be communicated to the Academy directly.

Other Independent Peer Review

The States and Indian Tribes asked whether another outside panel should be convened. Headquarters said that outside review is welcomed, and that the States and Indian Tribes may convene panels of their own, the EEG-WIPP model being a potentially good model. The States and Indian Tribes expressed the opinion that DOE should not work with any peer review group that will not involve the affected parties. They stated that affected parties should be permitted to review any peer review agreement in advance of it being entered into, and provide comments in writing to DOE. DOE said that they would encourage NAS to involve the States and Indian Tribes in DOE-NAS meetings consistent with their operating procedures.

Second Repository Program

The States and Indian Tribes asked DOE to explain the significance of the decision regarding the second repository program. DOE replied that site selection activity had been deferred indefinitely, but that work is continuing on technical and development studies, so as to be in a better position to proceed with site selection when the time comes. DOE is cooperating on an international basis in studies relating to crystalline rock, trying to enhance the ability to conduct certain tests, and examining other geologic media. A description of the activities planned for the second repository program will be presented in a supplement to the Mission Plan, which is currently being prepared.

The States and Indian Tribes expressed strong disagreement with the second repository decision and with the way in which that decision was reached and announced. They said that by taking unilateral action DOE violated the spirit of consultation and cooperation, and they also posed several questions pertaining to the basis of authority on which the decision was made. DOE declined to discuss the legal aspects of the issue, citing the litigation which is currently in progress.

Finally, the States and Indian Tribes asked what specifically prompted the Chicago Project Office to prepare the April and May options memoranda, and whether similar options papers are being prepared for the first repository program. DOE replied that the Department staff routinely assesses program options, but that no such options are being considered for the first repository.

Effect of Gramm-Rudman-Hollings on the OCRWM Program

Headquarters stated that the OCRWM program is not exempt from Gramm-Rudmann-Hollings. The actual impact is based on deficit projections, so in FY86 there was a 4% reduction and in FY87 it may be in the order of 8-10%.

Purpose and Scope of Future Quarterly Meetings

The States and Indian Tribes expressed dissatisfaction with the quarterly meetings. In their view, commitments are frequently not met and litigation prevents the discussion of too many issues. They proposed that in the future, meetings be held with DOE principals at least quarterly, on a rotating basis in the three affected States, publicly announced, and open to the public. The main focus of the meetings should be discussed, with program status reports not taking up more than half of the agenda. DOE should host the meetings and develop the agenda jointly with the States and Indian Tribes. The State of Washington volunteered to be the site for the next meeting, in the Fall.

A subcommittee of State, Tribal and DOE representatives was established to work together to develop a model for future meetings, to report back in writing to the affected parties by October 1.

EIS Status Report

DOE presented a status report on the progress of the Environmental Impact Statement (EIS) covering current activities, the anticipated schedule for completion, and the plan for State and Indian Tribal involvement.

EIS scoping will follow the completion of the SCP, because it is necessary for the public to understand what site characterization entails in order to participate fully in the scoping process. The States and Indian Tribes suggested that there may be some value to conducting EIS scoping simultaneously around the country to convey its importance as a national effort.

SCP Status Report

DOE presented a status report on the development of the SCP and distributed a handout of the SCP completion schedule for the Federal sites. The second draft of individual chapters and the assembled draft would be provided to the States and Indian Tribes for review. Headquarters will provide periodic updates of the schedule to the affected parties. The States and Indian Tribes emphasized the importance of having references in advance, in order to facilitate their ability to review the documents in a short time. DOE indicated that references will be provided in the final SCP.

	Albuquerque Commitment	Responsibility	Status
1.	U.S. Department of Energy (DOE) will send to all States and Indian Tribes new sets of technical coordination group minutes.	R. Stein	Completed: will be a continuing commitment. J. Leahy will send a list of minutes sent to date.
2.	DOE will provide to States and Indian Tribes copies of its annual planning guidance letters, if pertinent to site characterization (continuation of Atlanta commitment #7).	B. Purcell	Carried over
3.	DOE will provide States and Indian Tribes with design requirements and design reports for project-specific advanced conceptual designs. The original anticipated date of May 1986 may slip (continuation of Denver commitment #3 with modification of delivery date).	R. Stein	Carried over
4.	DOE's goal is to provide advance notice to States and Indian Tribes of DOE/NRC meetings at least 30 days in advance. If a change in date occurs, DOE will notify the States and Indian Tribes as soon as possible (continuation of Atlanta commitment #14, with modifications).	J. Knight	Continuing objective
5.	DOE will convey to the Secretary, the States and Indian Tribes' request that the Environmental Assessments (EA) not be released without a 30-day advance notice to States and Indian Tribes, specifying the exact release date. When the EA release date is announced, DOE will also provide States and Indian Tribes a description of all documents to be released with the EAs, and to the extent possible, with key decision dates in the process.	B. Purcell	Partially completed: see highlights

Albuquerque Commitment	Responsibility	Status
6. DOE will send to the first repository States and Indian Tribes and the Project Offices via Express Mail copies of the EA Congressional Briefing Book the day the final EAs are released.	B. Gale	No briefing book prepared
7. In the next ISCG package, DOE will include a copy of the State and Indian Tribe mailing list for the States and Indian Tribes to review and update as needed.	B. Gale	Completed: St. Louis ISCG; June 16-18, 1986
8. DOE/Office of Storage and Transportation Systems (OSTS) will develop alternatives for including host State and Indian Tribal participation in Transportion Coordination Group activities. These alternatives will be sent by letter to R. Loux, NV, with a copy sent to all other affected parties.	L. Barrett	Completed: Copy of letter in Portland, OR, reference package; June 9, 1986
9. DOE will submit information to States and Indian Tribes regarding whether there are official appeals in processes for decisions made on grants to States and Indian Tribes.	R. Gale	Completed: Draft Financial Assistance Guidelines reference package; August 13, 1986
10. DOE will provide States and Indian Tribes with Draft Financial Assistance Guidelines for their review and comments.	R. Gale B. Gale	Completed: Draft Financial Assistance Guidelines; August 13, 1986
11. DOE will provide to States and Indian Tribes an updated Site agenda; Characterization Plan (SCP) schedule when completed —approximately mid-May 1986 (continuation of Atlanta commitment #8, with modified delivery date).	R. Stein	Completed: Portland meeting August 13, 1986
12. DOE will provide States and Indian Tribes with agendas of the technical coordination group meetings in advance of the actual meeting dates. DOE will also provide States and Indian Tribes with one-page summaries of each technical coordination meeting (reiteration of Atlanta commitment #5)	R. Stein	Completed: will be a continuing commitment

	Albuquerque Commitment	Responsibility	Status
13.	The next meeting will be hosted by the Indian Tribes. A tentative time and date for this meeting is the first or second week of August in Eugene or Portland, Oregon. Russell Jim of the Yakima will work with Barry Gale on arrangements.	R. Jim	Completed: Portland meeting; August 13, 1986

ATTACHMENT B

SEP 5 1986

RW-222

FY 1987 Baseline Planning

Jeff Neff
Lee Olson
Don Vieth

This memo provides guidance to be used by your respective projects in developing FY 1987 baseline plans.

With the Presidential approval of sites for detailed characterization and the beginning of the next phase of the program, which involves a very extensive amount of work and a significantly larger budget, detailed planning is required to ensure that project activities are conducted effectively and efficiently. Although the many facets of the program make such detailed planning difficult, particularly with regard to scheduling specific activities, your efforts are required to develop the most reasonable plans possible for FY 1987. To guide your efforts, OGR has identified its priorities for FY 1987 and has developed a list of specific milestones. The priorities are as follows:

FY 1987
First Repository Program Priorities

First Priority Items (not in order)

- Ensure adequate quality assurance for exploratory shaft and site characterization activities.
- Complete all actions necessary to lift stop work orders and proceed with geoscience monitoring activities in full accord with OCRWM, OGR and project quality assurance directives.
- Establish local office in Texas for salt.
- Obtain access to land for salt and tuff.
- Issue the Site Characterization Plans, relevant study plans, and Conceptual Design Report.
- Issue the Environmental Monitoring and Mitigation Plans.
- Issue the Socioeconomic Monitoring and Mitigation Plans.

- Initiate monitoring of environmental and socioeconomic impacts.
- Obtain required permits for exploratory shaft construction and site characterization activities.
- Proceed with geologic, hydrologic and geochemical characterization of sites.
- Support grants to affected States and Indian Tribes.
- Negotiate C&C agreements.
- Issue MGDS requirements document.
- Issue functional design requirements for the exploratory shaft.
- Complete design of the exploratory shaft.
- Issue waste package and repository functional requirements for advanced conceptual design.
- Prepare post closure waste package strategy plans.

Second Priority Items (not in order)

- Ensure adequate quality assurance for remainder of program.
- Prepare Regulatory Compliance Plan.
- Implement waste package strategy plans.
- Start waste package advanced conceptual design.
- Proceed with development of performance assessment models.
- Support NRC interactions not required for First Priority items.
- Support development of licensing support system.
- Rebaseline project schedule and cost estimate.

Third Priority Items

- Other program activities including
    - repository advanced conceptual design
    - planning to support Environmental Impact Statement

To further guide your planning, the attached milestones have been identified. Milestones from FY 1986 that have not yet been achieved are included. We recognize that the dates identified for certain of the milestones can no longer be achieved and are not consistent with your latest plans. The dates for the salt site characterization and exploratory shaft activities are examples of this situation. Nevertheless, your FY 1987 baseline plans should come as close as possible to achieving the milestone dates in the attachment. The dates for several of the milestones are designated TBD, i.e., to be determined. These dates require further discussion between your staffs and their counterparts in OGR, which should take place before your plans are made final.

As of now, the following new FY 1987 budget authority should be assumed to be available:

	Total Project
BWIP	$132.4 million
NNWSI	$128.8 million
SRPO	$147.3 million

This new budget authority, in addition to the FY 1986 uncosted obligations, should be adequate to implement the FY 1987 program. Let us know as soon as possible if this is not the case. The difference between the above amounts and the budgets previously planned are currently earmarked for carryover to FY 1988, and can possibly be drawn down in FY 1987 with HQ approval. Such drawdown should only occur if necessary to conduct needed work in FY 1987. If your plans indicate that less funds than those shown above are required for FY 1987, the remainder will be carried over to FY 1988. Further, Congress has not completed action on the FY 1987 budget. The actual funds appropriated by Congress may not support the amounts shown above. In that event, your plans may have to be revised.

The past stipulation that funds requested from Congress for the exploratory shaft are not to be used for other project activities is to be maintained. Within the total project budget shown above, the following budget authority has been earmarked for the exploratory shaft:

	Exploratory Shaft
BWIP	$21.5 million
NNWSI	$16.0 million
SRPO	$23.4 million

You should ensure that these funds, plus the FY 1986 uncosted obligations for the exploratory shaft, are not used for other project activities. The exploratory shaft funds identified above may be less than what is needed to carry out the achievable FY 1987 exploratory shaft activities. As with the total project budget, let us know, as soon as possible, if this is the case. Exploratory shaft activities are not to be delayed for a lack of funding.

Our objective in providing this guidance is to enable your project to have its FY 1987 baseline plan in place as close to October 1, 1986, as possible. Once this plan is in place, rebaselining will require Headquarters approval. Also, the approval of the Director, Repository Coordination Division, will be required for changes in any individual milestones in the attachment that are designated Headquarters-controlled. You are requested to submit your FY 1987 baseline plan to Headquarters as soon as possible, but no later than the end of October 1986.

If you have any questions, please contact your Project Coordinator.

Original Signed by:
William J. Purcell

William J. Purcell
Associate Director for
Geologic Repositories

Attachment

cc: SRousso, RW-10
RHilley, RW-30
RGale, RW-40
D. Siefken, Weston

Attachment

MSA Milestones - SRP
through September 1987

Systems

*1.	Draft Systems Engineering Management Plan received at HQ for review and approval	8/86
*2.	Draft MGDS Requirements Document received at HQ for review and approval	6/86
*3.	Draft MGDS Description Document received at HQ for review and approval	6/86
*4.	Reference Data Bases for Waste Package, Repository and Site to HQ for review	TBD
5.	Configuration Management Plan to HQ for review	TBD
6.	Initiate Conceptual Model Development of Total System Postclosure Performance Model	6/87

Waste Package

1.	Performance Assessment of SCP Waste Package Design initiated	7/86
*2.	Draft Waste Package Advanced Conceptual Design (ACD) Requirements to HQ for review and approval	7/86
*3.	Report on Waste Package Postclosure Compliance Strategy to HQ for review and approval	7/86
4.	Initiate Testing on New Candidate Alternate Materials	10/86
5.	Issue Waste Package Design Report for Spent Fuel, DHLW and WV waste to HQ	10/86
6.	Issue Brine Migration Model Comparison Report	11/86

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* Headquarters controlled milestone, to be changed only under signature of the Director, Repository Coordination Division.

7.	Issue Detail Test Plan for all Spent Fuel tests to HQ	4/87
8.	Issue Detail Test Plans for all general corrosion tests	TBD
9.	Initiate Integrated Package Component Testing	5/87
*10.	Initiate Waste Package Advanced Conceptual Design	1/87
11.	Issue Draft Report of WP Fabrication Studies and Weld Development Techniques	7/87

Site

1.	Drilling of Engineering Design Boreholes (EDBH) initiated	10/86
2.	Environmental Data Collection for Surface-based Characterization Activities initiated	10/86
3.	Recommendation to Proceed with 3-D Seismic Survey to HQ for approval	10/86
4.	Submit comprehensive summary of data available on geoengineering properties, in Deaf Smith	11/86
5.	Surficial Geologic Mapping of Site Area completed	7/87
6.	Seismic Reflection Model interim results to HQ for review	11/86
*7.	Complete Surface-Based Test Plan	12/86
8.	Complete 6 ESF Monitoring Wells	2/87
9.	Complete ESF Foundation Borings	3/87
10.	Complete EDBH Testing	3/87
11.	Initiate Long-Term Groundwater Monitoring	4/87

12. Initiate Deep Hole Hydronest Drilling/Testing	1/87
13. Interim Rock and Soil Properties Report on EDBH issued to HQ	5/87
14. Initiate Shallow Hydronest Drilling/Testing	1/87
15. Site Environmental data for ESF permits completed	7/87
16. Complete 3-D Seismic Survey	2/87
17. Hydrology Program Plan to HQ for review and approval	5/87

Repository

1. Operating Concepts Final Report issued	TBD
*2. Repository SCP Conceptual Design Report received at HQ for review and acceptance	9/86
*3. Draft Repository Subsystem ACD Requirements Document to HQ for review and approval	TBD
4. Report Outlining a Preliminary Study of the Effects of Uncertain Geologic Data on Design of the Underground Facility to HQ for information	TBD
5. Retrievability Compliance Plan Strategy to HQ for review	10/86
6. Repository Performance Assessment Conceptual Model development completed	12/86
7. Rod Consolidation Study to HQ	11/86
8. Final Waste Emplacement Mode Study Report issued to HQ	2/87
9. Review of concepts developed by HEDL for remote/automated waste handling systems initiated	7/86
10. Initiate Repository Advanced Conceptual Design	1/87

11.	Initiate Preparation of Prototype Equipment Design	8/87
12.	Initiate Developments of Seal Requirements	6/87
*13.	Final FY 1989 Project Validation Material to HQ	3/13/87

Regulatory/Institutional

1.	Prime Site Grant Awareded	10/86
2.	Draft SCP to HQ for Final review	TBD
3.	Final SCP (camera-ready) to HQ	4/87
4.	Project Office input on EIS Implementation Plan to HQ for review	1/87
*5.	Working Draft Environmental Monitoring and Mitigation Plan to HQ for review	8/15/86
*6.	Complete and Sign C&C Agreement with State	11/28/86
7.	Submit Licensing Support System (LSS) Document Collection Procedure to HQ for approval	12/86
8.	Implement Document Collection for LSS	3/87
9.	EIS Scoping Complete	TBD

Exploratory Shaft

*1.	Submit Draft Title II (Final) Design Report Report received at HQ for review and acceptance	4/87
*2.	Submit Draft ESF Design Requirements for Final Design to HQ for review and approval	TBD
3.	Surface Facilities Bid Package issued	12/86
4.	Mining Contractor Bid Package issued	2/87
5.	SRP issues site specific In-situ Test Plan to the Public	TBD

6.	Procurement of data acquisition system for the site initiated	TBD
*7.	Start Site Preparation	7/87
8.	Start Construction of Surface Facilities	7/87
*9.	Final FY 1989 Project Validation Material to HQ	3/13/87
10.	Initiate Freeze Wall Formation	TBD

Test Facilities

1.	Issue Post Test Summary Report for Asse Brine Migration	11/86
2.	Issue Off-site Test Plan details	TBD

Land Acquisition

1.	Land Agent Agreement signed	TBD
2.	SRP submits Land Acquisition Plan to HQ	TBD
3.	SRP authorizes Land Acquisition	TBD
4.	Land access for ESF foundation borings	TBD
5.	Land access for site characterization activities	TBD
6.	Land access for EDBH	TBD

Project Management

*1.	Submit FY 1987 Baseline Plan to HQ	10/86
*2.	FY 89 Budget Submission/WPAS received at HQ	3/15/87
3.	[illegible] Project Plan to HQ	TBD

Attachment

MSA Milestones - BWIP
through September 1987

Systems

*1.	Draft Systems Engineering Management Plan to HQ for review and approval	8/15/86
*2.	Draft MGDS Requirements Document to HQ for review and approval	9/86
*3.	Draft MGDS Description Document to HQ for review and approval	9/86
*4.	Reference Data Bases for Waste Package, Repository and Site to HQ for review	TBD
5.	Complete Performance Assessment of Repository, Shaft Seals and Waste Package SCP Designs	5/87

Waste Package

*1.	Draft Waste Package Subsystem Advanced Conceptual Design (ACD) Requirements received at HQ for review and approval	TBD
*2.	Waste Package Advanced Conceptual Design Report received at HQ for review and acceptance	3/87
3.	Waste Package Structural Design Engineering Test Plan (Study Plan for SCP) received at HQ for information	9/86
*4.	Final BWIP Report on Feasibility of Using Copper as a Waste Package Material issued	9/86
*5.	Report on Waste Package Postclosure Compliance Strategy (Study Plan for SCP) to HQ for review and approval	7/86
*6.	Initiate Waste Package ACD	1/87

Headquarters controlled milestone, to be changed only under signature of the Director, Repository Coordination Division.

Site

1.	Large-scale Hydraulic Stress (LHS) Test(s) (at least one) completed	5/87
2.	Site Selections for Additional Hydrologic Monitoring Wells to HQ for approval	4/86
*3.	Working Draft Socioeconomic Monitoring and Mitigation Plan to HQ for review	8/15/86
4.	Three-dimensional Stratigraphic and Structural Model of the RRL documented and entered into Engineering Release System	11/86
5.	Complete Performance Assessment Conceptual Model	4/87
6.	Issue Status Report - Geochemical Modeling to HQ for information	5/87
7.	Complete Grande Ronde LHS Test	9/87
8.	Issue Status Report: Far Field Radionuclide Sorption Characterization	10/86

Repository

1.	Draft Repository Subsystem Advanced Conceptual Design (ACD) Requirements to HQ for review and approval	TBD
*2.	Initiate Repository ACD	1/87
3.	Integrated Rock Mechanics Characterization Plan (Study Plan for SCP) to HQ for information	6/86
*4.	Repository Seal Subsystem Design Requirements to HQ for review	TBD
5.	Repository Seal Conceptual Design initiated	7/87

*6.	Draft SCP Conceptual Design Report to HQ for review and acceptance	11/86
7.	Preliminary Study of the Effects of Uncertain Geologic Data on Design of the Underground Facility to HQ for information	5/86
8.	Review of concepts developed by HEDL for remote/automated waste handling systems initiated	7/86
9.	Retrievability Compliance Strategy Plan to HQ for review	TBD
10.	Rod Consolidation Study to HQ	11/86
*11.	Final FY 1989 Project Validation Material to HQ	3/13/87

Regulatory/Institutional

*1.	Draft SCP to HQ for Final review	12/86
*2.	Final SCP (camera-ready) to HQ	1/87
3.	Project Office input on EIS Implementation Plan to HQ	1/87
*4.	Working Draft Environmental Monitoring and Mitigation Plan to HQ for review	8/15/86
*5.	Complete and sign C&C Agreement with State and Tribes	11/28/86
6.	Submit Licensing Support System (LSS) Document Collection Procedure to HQ for approval	12/86
7.	Implement Document Collection for LSS	3/87
8.	Issue SCP Progress Report	9/87
9.	EIS Scoping Complete	6/87

Exploratory Shaft

*1.	Submit Draft ESF Design Requirements for Final Design to HQ for review and approval	TBD
*2.	Submit Draft Final Design Report to HQ for review and acceptance	9/87
3.	Complete Construction Readiness Review for First Shaft (ES-1)	3/87

*4.	Start First Shaft (ES-1) Construction	5/87
*5.	Final FY 1989 Project Validation Material to HQ	3/13/87

Test Facilities

1.	Issue Near Surface Test Facility Operating Plan to HQ for information	9/86

Project Management

*1.	Submit FY 87 Baseline Plan to HQ	10/86
2.	Final BWIP Project Management Plan to HQ for concurrence	TBD
3.	Final BWIP Project Plan to HQ for approval	TBD
*4.	FY 89 Budget Submission/WPAS to HQ	3/15/87

Attachment

MSA Milestones - NNWSI Project
through September 1987

Systems

*1.	Draft Systems Engineering Management Plan to HQ for review and approval	M108	8/1/86
*2.	Draft MGDS Requirements Document to HQ for review and approval	M120	8/86
*3.	Draft MGDS Description Document to HQ for review and approval	M261	9/86
4.	Annual PASS Program Interaction-Letter Report to HQ for information	M870	9/86
5.	Report on Studies of Coupled Processes included in SCP to HQ for information	R109	11/86
*6.	Updated MGDS Requirements Document to HQ for review and approval	M158	8/87
7.	Annual PASS Program Interaction-Letter Report to HQ for information	P132	9/87
*8.	Reference Data Bases for Waste Package, Repository and Site to HQ for review	-	TBD

Waste Package

*1.	Draft Waste Package Subsystem Advanced Conceptual Conceptual Design (ACD) Requirements to HQ for review and approval	M013	9/1/86
*2.	Report on Long-term Waste Package Performance Analysis of Conceptual Design to HQ for information	M260	1/87
*3.	Final NNWSI Report on Feasibility of using Copper as a Waste Package Material issued	M247	9/86
4.	Report on Systems Model for Waste Package Performance Analysis to HQ for review	M276	7/86

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* Headquarters controlled milestone, to be changed only under signature of the Director, Repository Coordination Division.

5. Report on Tests of Candidate ACD Metal Barrier Materials to HQ for review	M236	7/86
6. Decision on Packing Material for Spent Waste Package to HQ for review	M257	3/86
*7. Report on Waste Package Postclosure Compliance Strategy to HQ for review and approval	-	7/86
*8. Initiate Waste Package ACD	M233	1/87

Site

1. Final Radiological Monitoring Plan to HQ for information	M897	2/87
2. Complete Model of Chemical Composition of Yucca Mountain groundwater - issue report	R360	9/89
*3. Working Draft Socioeconomic Monitoring and Mitigation Plan to HQ for review	P029	8/15/86
4. Report on Geochemical Simulation of Yucca Mountain to HQ for information	M325	7/86
5. Report on Evaluation of Natural Resources at Yucca Mountain and Vicinity to HQ for information	M895	6/87
6. Surficial Geologic Mapping completed	M899	5/87
7. Summary Report on Regional Geophysical Investigations to HQ for information	M369	5/86
8. Report on Quaternary Climate of Yucca Mountain to HQ for information	M366	10/88
9. Begin Air Quality Monitoring	N345	9/87
10. Begin Noise Monitoring	R639	9/87
11. Final Air Quality Monitoring Plan to HQ for information	R327	5/87
12. Complete Hydro Testing of Unsaturated Zone	P519	6/87
13. Report on Completion of Trench Preparation at Surface Facilities Site to HQ for information	P509	3/87

14. Issue Map: Final Geologic Map of Yucca Mountain	P780	12/86
15. Issue Interim Report: Future Hydrologic Conditions at Yucca Mountain	P790	5/87
16. Issue Preliminary Report: Sorption Modeling	R309	10/86
17. Issue Summary of 3-D Mineralogic Variation along Transport Pathways	M335	7/87
18. Issue Report: Controls on Composition Variation in Groundwaters at Yucca Mountain Areas	R485	10/86
19. Recommendation to Proceed with Deep, Regional Seismic Survey to HQ for approval	-	TBD
20. Recommendation to Proceed with Southern Tracer Experiment in the Saturated Zone to HQ for approval	-	TBD

Repository

1. Letter Report: Feasibility Analysis on Horizontal Waste Emplacement and Retrieval to HQ for review	M295	5/86
2. Horizontal Waste Emplacement Equipment Development Plan to HQ for review	N406	7/86
*3. Draft Repository Subsystem ACD Requirements Document to HQ for review and approval	N433	10/86
4. Seals Materials Recomendation Report to HQ for review	P404	9/86
*5. SCP Conceptual Design Report to HQ for review and acceptance	N432	9/15/86
6. Report on G-Tunnel Underground Facility Summary to HQ for review	M455	9/86
*7. Initiate Repository ACD	N430	1/87
8. Report on Effects of Uncertain Geologic Data on Design of Underground Facility to HQ for information	N457	8/86
9. Review of Concepts Developed by HEDL for Remote/Automated Waste Handling Systems initiated	M802	7/86

10. License Application Design A/E Candidates Selection completed	N421	7/87
11. Fabrication completed on Waste Emplacement Development Prototype Boring Machine (DPBM)	P403	5/87
12. Initiate Horizontal Drill Tests in G-Tunnel (DPBM)	N603	9/87
13. Retrievability Compliance Strategy Plan to HQ for review	-	TBD
14. Rod Consolidation Study to HQ	-	11/86
*15. Final FY 1989 Project Validation Material to HQ	N118	3/13/87

Regulatory/Institutional

*1. Draft SCP to HQ for Final review	M521	11/86
*2. Final SCP (camera-ready) to HQ	M522	12/86
3. Project Office input on EIS Implementation Plan to HQ for review	M599	1/87
*4. Working Draft Environmental Monitoring and Mitigation Plan to HQ for review	P033	8/15/86
*5. Complete and Sign C&C Agreement with State	M795	11/28/86
6. Submit Licensing Support System (LSS) Document Collection Procedure to HQ for approval	-	12/86
7. Implement Document Collection for LSS	-	3/87
8. Issue SCP Progress Report	M947	9/87
9. EIS Scoping Complete	-	TBD

Exploratory Shaft

1. Award Shaft and Mining Subcontract	M022	3/87
*2. Submit Draft ESF Design Requirements for Final Design to HQ for review and approval	-	TBD

*3.	Submit Draft ESF Final Design Report to HQ for review and approval	-	TBD
*4.	Start Site Preparation	M645	12/1/86
5.	Complete Construction of Surface Facilities	M646	5/87
6.	Complete ESF Construction Readiness Review	R033	4/87
*7.	Start First Shaft (ES-1) Construction	M652	5/87
*8.	Final FY 1989 Project Validation Material to HQ	-	3/13/87

Test Facilities

1.	Complete Proof-of-Concept Horizontal Boring Machine Demonstration	M281	4/87

Project Management

1.	Submit FY 1987 Baseline Plan to HQ	-	10/86
2.	Final NNWSI Project Management Plan to HQ for concurrence	R448	6/86
3.	Updated NNWSI Project Plan to HQ for approval	R810	TBD
*4.	FY 89 Budget Submission/WPAS to HQ	M712	3/15/87
5.	Implement Phase II Earned Value System	M725	10/86

ATTACHMENT C

THE SECRETARY OF ENERGY
WASHINGTON, D.C.

June 27, 1986

Dear Governor Bangerter:

Thank you for your letter of April 25, 1986, concerning pre-notification of the release date for the final Environmental Assessments (EAs).

On May 27, 1986, I issued the EAs and nominated five sites for detailed site characterization for the Nation's first geologic repository for high-level radioactive waste. The activities at the Department of Energy prior to this date did not permit me to identify in advance, with any degree of accuracy, the exact day on which this decision would be made.

Under ideal circumstances, I would like to have given you and your colleagues at least a two-week pre-notification of the release day. Mr. Ben Rusche, Director, Office of Civilian Radioactive Waste Management, in an April 15, 1986, letter to you did identify mid-May as our best estimate.

Having made the decision to issue the EAs, I felt it was in the public interest not to delay the process further. As you know, release of the final EAs had already been substantially delayed to review over 20,000 public comments on the draft documents and to allow sufficient time for an independent review of the decision-aiding methodology by the National Academy of Sciences.

I regret any inconvenience caused by your not having an exact release date, and hope that you will understand my position.

Yours truly,

John S. Herrington

John S. Herrington

Honorable Norman H. Bangerter
Governor of Utah
Salt Lake City, Utah 84114

ATTACHMENT D

For your background information, Detlof von Winterfeldt, an associate professor at the University of Southern California, is not a member of the National Academy of Sciences' Board on Radioactive Waste Management. As noted in his letter, he was invited by the Board as a consultant to participate in the review of DOE's decision-aiding methodology. He was acting as an individual in the review process. DOE disagrees with Professor von Winterfeldt positions on the analysis and decision process that led to the recommendation of the three sites for characterization.

Detlof von Winterfeldt
26424 Athena Ave.
Harbor City, CA 90710

August 19, 1986

Mr. Ben Rusche
Director,
Office of Civilian Radioactive Waste Management
U.S. Department of Energy
1000 Independence Ave., S.W.
Washington, D.C. 20585

Dear Mr. Rusche:

I very much appreciated talking to you about the analysis and decision process that led to the recommendation of the Yucca Mountain, Hanford, and Deaf Smith sites for characterization. Our telephone conversation and my discussion with Tom Isaacs here in Los Angeles last week made it clear that a serious attempt was made to balance the analysis results against non-analysis considerations. Our discussions also allowed me to formulate my main concerns more concisely.

First, the Recommendation Report (DOE-S-0048) does not represent the analysis results reported in the Methodology Report (DOE-RW-0074) in a balanced way. In fact, from reading the Recommendation Report, it is hard to recognize that the analysis arrived at the following firm and stable rank ordering of the sites: Yucca Mountain, Richton Dome, Deaf Smith, Davis Canyon, and Hanford. In my opinion, the Recommendation Report clearly fails to communicate the content of the Methodology Report in its entirety.

Second, the value implications of recommending to characterize the Yucca Mountain, Hanford and Deaf Smith sites are inconsistent with the judgments made by your experts and staff during the analysis. Even extensive sensitivity analyses on these value judgments were not able to change the stable rank ordering arrived at in the analysis.

Third, and this is a personal judgment, I found the value judgments made within the framework of the analysis very reasonable, while I thought that those implied by the final decision were not. In particular, I did not find it reasonable to select sites for characterization that cost billions of dollars more than other sites and that have seemingly little advantages that would justify the additional costs.

Thank you again for the opportunity of discussing these issues with you and your staff.

Sincerely,

Detlof von Winterfeldt

00719

Detlof von Winterfeldt
26424 Athena Avenue
Harbor City, CA 90710

[illegible] - 3CE5

July 22, 1986

Mr. Ben Rusche
Director,
Office of Civilian Radioactive Waste Management
U.S. Department of Energy
1000 Independence Ave., S.W.
Washington, D.C. 20585

Dear Mr. Rusche:

As you may recall, I participated in the National Academy of Science's review of DOE's methodology for siting the first radioactive waste repository as a decision analyst consultant to the Board of Radioactive Waste Management. I now have reviewed the final documents "A multiattribute utility analysis of sites nominated for characterization for the first radioactive-waste repository - a decision aiding methodology" (DOE-RW-0074, in the following referred to as "Methodology Report") and "Recommendation by the Secretary of Energy of candidate sites for the first radioactive-waste repository" (DOE-S-0048, in the following referred to as "Recommendation Report"). I will comment on these two documents solely as an individual decision analyst.

In brief, I believe that the conclusions drawn in the Recommendation Report are based on selective and misleading use of the analysis described in the Methodology Report. It is extremely hard to find in the Methodology Report any support for the selection of the specific set of three sites recommended for characterization. Instead, I find a convincing analysis that clearly rejects the Hanford site and, furthermore, supports the selection of the Richton Dome site over the Deaf Smith site. The way the Methodology Report was interpreted in the Recommendation Report, in my opinion, comes very close to a misuse of an otherwise excellent analysis.

The following detailed comments are provided in four sections. First, I will describe the perspective of my comments and the assumptions on which they are based. In the second section, I will criticize the inclusion of the Hanford site as a candidate for characterization. In the third section, I will criticize the choice of the Deaf Smith site over the Richton Dome site. The fourth section will summarize my comments and add some concluding remarks.

Perspective of the comments. To put my detailed comments into perspective, let me first state my opinion that the analysis described in the Methodology Report is sound, thorough and state-of-the-art. It arrives at a clear and stable rank ordering of the five sites (Yucca Mountain, Richton Dome, Deaf Smith, Davis Canyon, and Hanford, in that order). My argument is not based on a criticism of that report, but rather on the conclusions drawn from it. My arguments are also not based on a criticism of the judgments by DOE experts and managers that went into the multiattribute utility analysis. These judgments were made prior to the knowledge of the results of the analysis and, specifically, before the analysis based site rankings became known. I have more confidence in these judgments than in the judgments applied in the Recommendation Report which were made after the analysis results were known. My criticisms are based mainly on the mismatch between the judgments made during the analysis and those applied after the analysis.

I realize, of course, that the multiattribute utility analysis described in the Methodology Report is only a decision aiding tool, and that other judgments are necessary to select an appropriate portfolio of sites. Two additional judgments are important to make a portfolio decision: diversity of geohydraulic settings and diversity of rock types. According to the Recommendation Report "Any combination of the three recommended sites will,..., provide the maximum diversity in geohydraulic settings." This consideration, therefore, should not influence the selection of the three sites. Diversity of the host rock is the remaining criterion not addressed in the Methodology Report that could conceivably change the recommendation from those suggested by the results reported in the Methodology Report. My criticisms are not based on the use of the diversity judgments to arrive at a final portfolio, but rather on the peculiarities of the implied value judgments in this final choice.

Criticism of the choice of the Hanford site. The analysis clearly identifies Hanford as the overall loser among the five sites. It is important to point out that the analysis led to that conclusion based on the judgments of DOE experts and managers. The fact that these judgments are expressed in monetary units is incidental to the fact that Hanford is clearly the worst of all sites. Any expression of the impacts of the sites, even without further analysis, would lead to rejection of Hanford as a reasonable candidate.

There is no doubt that Hanford is the worst site in terms of post-closure criteria. It is also the worst or equal to the worst site on ten of the 14 pre-closure criteria. There appears to be no reasonable set of weights for which Hanford would come out to be a "pre-closure winner." The Recommendation Report proposes a set of weights, however, by arguing to ignore repository and transportation cost (a steep $2.710 Billion higher than the second most expensive site, Davis Canyon). Aggregating over the remaining 12 criteria, Hanford does indeed become a "winner" by an equivalent amount of $12 Million over the second best site (Yucca Mountain) and $158 Million over the worst site (Davis Canyon). The Recommendation Report uses this scheme to point to the pre-closure superiority of Hanford. However, it fails to acknowledge that Hanford is still the worst or equal to worst on _all_ eight health and safety criteria. The only criteria on which Hanford "shines" are the four having to do with aesthetics, archaeological/historical/cultural, biological and socioeconomic impacts.

In my opinion, the Hanford site, being the worst on the post-closure criteria and the worst on all but four pre-closure criteria comes close to being a dominated site that never should be chosen, unless other criteria and/or a very peculiar set of judgments are invoked. My interpretation of the inclusion of the Hanford site in the set of the three finalists is that in DOE's judgment the combined drawbacks of Hanford (worst post closure radiological impacts, worst pre-closure health effects and worst costs by at least $2.710 Billion) are outweighed by its advantages in terms of aesthetics, archaeological/historical/cultural, biological, and socioeconomic benefits combined with the increased diversity of adding another host rock to the portfolio.

Criticism of the choice of the Deaf Smith site over the Richton Dome site. The arguments leading to the inclusion of the Deaf Smith site over the Richton Dome site also require a fair amount of selective use of the analysis. There is little doubt that, in terms of post-closure criteria, both sites are excellent and virtually indistinguishable. On the pre-closure criteria the Richton Dome site is better or equal to the Deaf Smith site on eleven of the fourteen criteria. The only criteria on which the Deaf Smith site is better are: public radiological fatalities from the repository, biological impacts, and socioeconomic impacts. Richton Dome is better or equal to the Deaf Smith site on seven of the eight pre-closure health criteria. It is true, however, that on all criteria the two sites are very close, except for transportation and repository costs. The combined difference here is a significant $650 Million.

Since both sites are salt sites, the task of choosing among them cannot involve judgments of the diversity of the host rock, and instead boils down to weighing the non-cost impacts against the cost differential of $650 Million. By choosing the Deaf Smith site over the Richton Dome site, DOE essentially signals that the very small advantages of the Deaf Smith site on one health criterion and the biological and socioeconomic criteria outweigh its disadvantages in the other seven health-criteria, the archaeological/historical/cultural criterion and an additional cost of $650 Million.

Conclusions. The logical implications of the judgments and estimates made by DOE experts and managers themselves as reported in the Methodology Report clearly argue for exclusion of the Hanford site and for choosing the Richton Dome site over the Deaf Smith site. The most important conclusion that I draw from the Recommendation Report's inclusion of the Hanford and Deaf Smith sites is that DOE is apparently willing to accept more health effects and an additional cost of $3.360 Billion in return for several minor advantages of the two sites. As a decision analyst, I find these implications inconsistent with the Methodology Report. As a concerned member of the public and a taxpayer, I find them irresponsible.

In conclusion, I would like to commend DOE for an excellent analysis, and for its thorough documentation of this analysis in the Methodology Report. After the strong criticism following the December 1984 publication of the site evaluation and the recommendation of Yucca Mountain, Deaf Smith and Hanford, DOE implemented a rigorous approach that suggested a quite different mix of sites. Unfortunately, it appears that DOE chose to ignore the implications of its own analysis, and of its own experts' and managers' opinions, and instead simply repeated the choice that was made one and a half years ago.

Sincerely,

D v Winterfeldt

Detlof von Winterfeldt
Associate Professor,
Systems Science Department
University of Southern California

cc: Frank Parker

ATTACHMENT E

Department of Energy
Washington, DC 20585

JUL 25 1986

Frank Press, Ph.D
President
National Academy of Sciences
2101 Constitution Ave., N.W.
Washington, D.C. 20418

Dear Dr. Press:

On May 28, 1986, President Reagan approved the Department of Energy (DOE) recommendation of sites in Texas, Nevada, and Washington to be characterized as part of the program to site the Nation's first high-level radioactive waste repository. As you are aware, the National Academy of Sciences (NAS) Board on Radioactive Waste Management conducted an independent review of the methodology used to aid the recommendation decision as well as the application of that methodology. The suggestions and conclusions of the Board in the review process proved to be of significant value to the program and the general endorsement of our use of the methodology provided added confidence in our process.

With the President's approval of our recommendation, the nature of first repository program activities will shift substantially and now focus for the next several years on characterization of the three sites to determine the final suitability and preference of those candidate sites for repository development. Preliminary discussions with Board members and staff have identified significant benefits of continued Board oversight of activities during this next important site characterization phase in the repository program. They have also identified the desirability to have the Board and the Academy review the proper scope and content of future Board involvement with particular emphasis given to site-specific and comparative evaluations through the establishment of suitably constituted panels of the Board.

DOE recognizes and endorses the need for the Academy to have autonomy in formulating the nature of its participation. We believe that the recent discussions can form the basis for an effective future Academy role. Given current activities such as development of site characterization plans and implementation of the quality assurance program, timely Board participation will be of substantial value. We are prepared to work with the Academy and its Board in further refining its role, and look forward to receiving a positive indication of continuing Academy involvement and your views on these relationships.

Sincerely,

Ben C. Rusche

Ben C. Rusche, Director
Office of Civilian Radioactive
Waste Management

NATIONAL RESEARCH COUNCIL

2101 CONSTITUTION AVENUE WASHINGTON, D. C. 20418

IE CHAIRMAN

August 14, 1986

C. Rusche
ector, Office of Civilian
adioactive Waste Management
artment of Energy
l Stop GB-270
hington, DC 20585

r Ben:

Your recent letter requesting assistance from the ional Research Council in the site characterization phase the repository program suggests continuation of what has ome a substantial and effective interaction between the earch Council and the Department of Energy. These are ortant national issues of just the sort that the Research ncil was established to consider.

The National Research Council can and will provide the ice you seek. I have asked Dr. Peter Myers, Staff ector of our Board on Radioactive Waste Management, to k with your staff to propose next steps that will enable Board to respond positively to your request.

Yours sincerely,

Frank

Frank Press
Chairman

034208

DOE F 1325.8
(12-84)

United States Government | Department of Energy

memorandum

DATE OCT 2 0 1986

REPLY TO
ATTN OF RW-223

SUBJECT Commitments Status Report from the Quarterly Meeting of States and Indian Tribes Held in Portland, Oregon, August 13, 1986

TO

Distribution

The following status report is provided for the Commitments 2, 5, 8, 11, 12, 13, and 14 from the August 13, 1986, Portland, Oregon, Quarterly Meeting. The other commitments have been reported on.

COMMITMENT NUMBER	STATUS
2	Our current projections for release of the design requirements documents are as follows:

	Waste Package	Repository
Basalt	12/86	2/87
Tuff	1/87	1/87
Salt	1/87	1/87

COMMITMENT NUMBER	STATUS
5	Ongoing.
8	Comments have been received from Washington, Nevada, Utah, and Mississippi, and the three Indian Tribes. The Guidelines are being revised and will be submitted for final review the first part of November.
11	This has been done verbally and will be part of continuing discussions with NAS.
12	The Udall transcript is not available yet.
13	The meetings will be scheduled shortly.
14	A meeting was held September 11, 1986, between Tom Isaacs, Don Vieth, Terry Husseman, Ron Halfmoon, and Stephen Hart. Additional discussions are needed on several unresolved issues. A followup meeting will be scheduled soon.

Department of Energy
Washington, DC 20585

FEB 27 1987

Mr. Kendall Hall, Chairman
Board of Trustees
Umatilla Confederated Tribes
P. O. Box 638
Pendleton, OR 97801

Dear Mr. Reuben:

I would like to take this opportunity to invite you and members of your staff and support contractor to attend and participate in the next HQ/OGR Auditor Training Course, scheduled for April 21 and 22, 1987.

As you know, auditor training was discussed during the Quality Assurance Coordinating Group meeting held in Las Vegas, Nevada on January 29, 1987. The course dates were selected to encourage partication of the State and Tribal representatives in both the training course and the next QACG Meeting which is scheduled for April 23, 1987, at the Germantown, Maryland, DOE facility.

The Auditor Training Course, as well as the QACG Meeting, will be held at the Germantown, Maryland, DOE facility located near the intersection of I-270 and State Road Number 118, approximately 18 miles northwest of downtown Washington, D.C. The classes will start at 9:45 a.m. each day and adjourn at 3:45p.m. Classes will be conducted in E-401 conference room. Because the DOE building is a secure area, it is necessary to be badged and escorted. A DOE escort will be provided in the Germantown North Building lobby to escort attendees to the conference room prior to start of classes each day.

The non-fee classroom lectures and working sessions will cover the theory as well as the practice of auditing for geologic repository programs. Course material to be covered includes: composition of a quality/technical audit, elements of an audit system, attributes of an auditor, basic steps in the conduct of an audit, regulatory requirements, OGR QA requirements, development of audit checklists, auditing for effectiveness, audit records, and audit close-out. Upon successful completion of the Auditor Training Course, each State and Tribal representative will be presented a "Certificate of Completion." Attached is a list of lodgings in the area that is available. We ask that you make your own lodging arrangements. If you plan to attend the auditor training course, the QACG Meeting, or both, please contact Karl Sommer (202-586-1639) so that arrangements can be made for your badge and escort. We look forward to seeing you in April and appreciate your interest in our Program.

Sincerely,

Carl Newton

Carl Newton, Quality Assurance
Manager, Office of Geologic
Repositories, OCRWM

Distribution

Mr. J. Herman Reuben, Chairman
Nez Perce Tribal Executive Committee
Box 305, Main Street
Lapwai, ID 83540

Mr. Kendall Hall, Chairman
Board of Trustees
Umatilla Confederated Tribes
P. O. Box 638
Pendleton, OR 97801

Mr. Melvin R. Sampson, Chairman
Yakima Tribal Council
Yakima Indian Nation
P. O. Box 151
Toppenish, WA 98948

Mr. Terry Husseman
Program Director
Office of High-Level Nuclear
  Waste Management
Washington State Department
  of Ecology, MS PV-11
Olympia, WA 98504

Mr. Max S. Power
Washington State Institute for
  Public Policy
Science and Technology Project
The Evergreen State College
4111 Seminar Building TA-00
Olympia, WA 98505

Mr. Steve Frishman, Director
Nuclear Waste Program Office
Office of the Governor
201 E. 14th Street, Room 205
Austin, TX 78711

Mr. Patrick Spurgin, Director
High-Level Nuclear Waste Office
355 West North Temple
Suite 330
Salt Lake City, Utah 84180-1203

Mr. Robert Loux, Jr.
Director
Nuclear Waste Project Office
Office of the Governor
Capitol Complex
Carson City, NV 89710

Mr. Hall Bohlinger
Assistant Administator Nuclear
Energy Division
P. O. Box 14690
Baton Rouge, LA 70898

Mr. John W. Green, Jr.
Executive Director
Department of Energy &
Transportation
214 Watkins Building
510 George Street
Jackson, MS 39202

Ms. Susan Zimmerman, Geologist
Nuclear Waste Program Office
Office of the Governor
P. O. Box 12428
Austin, TX 78711

Mr. James Reed
Advisory Committee on Institutional
Government Relations
P. O. Box 13206
Austin, TX 78711

Ms. Cheryl Runyon
National Conference of State Legislatures
1050 17th Street
Suite 2100
Denver, CO 80265

Mr. Carl Johnson
Nevada Nuclear Waste Storage
Investigation
State of Nevada
Capitol Complex
Carson City, NV 89710

Mr. Don Provost
Ofc. of High Level Nuclear Waste
Management
Department of Ecology
Mail Stop P.V. -11
5820 Pacific Avenue
Lacey, WA 98503

Mr. Stephen S. Hart
Council of Energy Resource Tribes
1580 Logan Street, Suite 400
Denver, CO 80203

Mr. Hal Aronson
Nuclear Waste Program
Yakima Indian Nation
5041 West Fair Avenue
Littleton, CO 80123

Mr. Robert Mooney
State of Washington
Dept. of Social & Health Services
Office of Radiation Protection
MS LE-13
Olympia, WA 98504

Mr. William Burke
Nuclear Waste Project Director
Umatilla Confederated Tribes
P. O. Box 638
Pendleton, OR 97801

Mr. Ronald T. Halfmoon, Manager
Nuclear Waste Policy Act Program
Nez Perce Indian Tribe
P. O. Box 305
Lapwai, ID 83540

Dennis Bechtel, Planning Coordinator
Clark County, Nevada
225 Bridger Street
Las Vegas, Nevada 89155

Robert Palm
Clark County, Nevada
225 Bridger Street
Las Vegas, Nevada 89155

Russel Jim
Yakima Tribal Council
Yakima Indian Nation
P.O. Box 151
Toppenish, WA 98948

Bim Oliver
355 W. North Temple
#3 Triad Center, Suite 300
Salt Lake City, Utah 84180-1203

PC Code: QACGLIST

DOE F 1325.8
(1-84)

United States Government

Department of Energy

memorandum

DATE: FEB 11 1987

REPLY TO ATTN OF: RW-223

SUBJECT: Concurrence on Grant Award

TO: John J. Mahoney, Chief
Acquisition and Assistance Operations Branch, CH

Attached is Headquarter's concurrence on the grant award to the Penobscot Indian Nation.

Please contact Allen Benson at FTS 896-1116 if you have any questions.

Stephen H. Kale
Associate Director for
Geologic Repositories
Office of Civilian Radioactive
Waste Management

Attachment

cc: Sally Mann

[illegible]

United States Government **Department of Energy**

memorandum

DATE: February 9, 1987

REPLY TO ATTN OF: RW-223

SUBJECT: Notice of Concurrence Action

TO: John J. Mahoney, Chief
Acquisition and Assistance Operations Branch

REVIEW:

Draft award documents for proposed grant, number DE-FG02-86CH10268, A002 in the amount of $ 15,889., from the State/Tribe Penobscot Indian Nation, have been received by the Office of Geologic Repositories.

ACTION:

XXX CONCUR
___ NONCONCUR
___ REVIEW-SCHEDULE BELOW

COMMENTS:

Stephen H. Kale
Associate Director for
Geologic Repositories
Office of Civilian Radioactive
Waste Management

DOE F 1325.8
(12-84)

United States Government | Department of Energy

memorandum

DATE: FEB 24 1987

REPLY TO ATTN OF: RW-24

SUBJECT: Project Review of OGR QACG Charter

TO:
J. Neff, SRPO
D. Vieth, WMPO
J. Antonnen, BWID
S. Mann, RTTD

OGR Procedure 1.0 required revision of all Coordinating Group Charters. Attached is a draft of the revised charters for the Quality Assurance Coordinating Group and the Quality Assurance Working Group on Waste Acceptance. We would appreciate your review and comments on the Charter by March 15, 1987.

Also attached is a copy of OGR Procedure 1.0. In commenting on these Charters please do not furnish comments whose incorporation would conflict with the requirements of OGR Procedure 1.0.

James P. Knight, Director
Siting, Licensing & Quality Assurance
Division, Office of Civilian Radioactive
Waste Management

Attachments

QUALITY ASSURANCE COORDINATING GROUP

CHARTER

SCOPE

A Quality Assurance Coordinating Group (QACG) is established within the Office of Geologic Repositories (OGR) to provide coordination in the planning, development and implementation of quality assurance (QA) programs of HQ-OGR, project offices and their major participating contractors. The QACG is to ensure that uniform QA requirements are specified at the projects and that measures for meeting these QA requirements are applied in a consistent manner by the participating organizations.

PURPOSES

The QACG has the following purposes:

1. To provide a forum for:
    - a. exchanging information between projects and with HQ-OGR to insure a clear understanding of problems and issues related to quality, status and progress of project specific quality assurance programs, and plans for resolution of problems;
    - b. identifying problems affecting quality that is generic among the QA organizations within the repository program;
    - c. joint discussion of interface issues with other elements of the repository program (e.g., licensing, design, SCP preparation, etc.);

d. outside consultants or experts to brief the members on technical issues of common interest, and

e. Consultation and Cooperation (C&C) discussions with representatives of the NRC and affected States and Indian Tribes.

2. To assure a coordinated approach to QA and in the development of QA plans and QA administrative procedures among HQ-OGR and the projects.

3. To develop a unified approach within OGR towards meeting QA requirements mandated by NRC.

4. To identify additional QA requirements that need to be specified for the repository program and to develop appropriate QA supplements for this purpose.

ORGANIZATION

The OGR QA Manager will be the QACG Chairperson. The DOE-HQ contractor's (WESTON) QA Manager will serve as QACG Secretary. The QACG Chairperson and Secretary are voting members. Other voting members are the QA Managers of Project Offices and their counterparts from the project contractor organizations. The QA Managers of OCRWM, OSTS, DOE Operations Offices overviewing the Project Offices and of other major participating contractors will be non-voting members.

The QACG Chairperson may invite other QA Managers involved in the repository program to participate in the meetings and other activities of the QACG as non-voting members.

The Chairperson may organize Task Forces or Working Groups to undertake specific assignments identified by the QACG. These Task Forces or Working Groups will be organized from among the voting and non-voting members and will report to the QACG Chairperson. The QACG Chairperson will report to the OGR Associate Director regarding QACG activities and other matters affecting the QACG.

MEMBERSHIP

The QACG membership will be as follows:

OGR QA Manager, OGR	Chairperson
QA Manager, WESTON	Secretary
QA Manager, BWIP	Voting Member
QA Manager, WMPO	Voting Member
QA Manager, SRPO	Voting Member
QA Manager, RTTD	Voting Member
QA Manager, RHO	Voting Member
QA Manager, SAIC	Voting Member
QA Manager, ONWI	Voting Member
QA Manager, OWTD	Voting Member
QA Manager, DOE-NV	Non-voting Member
QA Manager, DOE-CH	Non-voting Member
QA Manager, OSTS	Non-voting Member
QA Manager, OCRWM	Non-voting Member

The OGR Director of Siting, Licensing and Quality Assurance and involved DOE Project Managers, upon recommendation of their respective Project QA Managers, may recommend to OGR any QA personnel in their organizational units and/or QA Managers of major contractors to become non-voting members of the QACG. The QACG Secretary will maintain an updated list of the QACG membership.

RESPONSIBILITIES

QACG Chairperson

The QACG Chairperson has the following duties and responsibilities:

a. Plan, schedule, call, direct and manage to completion the QACG meetings.

b. Prepare agenda for each meeting and distribute copies to QACG members, chairs of other coordinating groups, NRC, affected States and Indian Tribes.

c. Prepare and distribute summary and minutes of each meeting completed.

d. Invite attendance of person(s) needed in support of meeting agenda item(s).

e. Organize task forces or working groups, as necessary.

f. Inform QACG members on current OGR policy relative to State and Tribal involvement in coordinating group meetings, and to comply with this policy.

g. Report to the OGR Associate Director on QACG activities and related matters.

QACG Secretary

The duties and responsibilities of the Secretary include the following:

a. Prepare minutes and summary of QACG meetings. Reproduce and distribute copies, as directed by the Chairperson.

b. Solicit meeting discussion items from the members.

c. Maintain an updated list of the QACG membership.

Members

Each member is responsible for the following:

a. Submitting status reports on his/her organization's QA activities.

b. Informing the Chairperson of any quality problem, issue or information that may be of interest to the QACG.

c. Recommend to the Chairperson item(s) for discussion in coming QACG meetings.

OPERATING PROCEDURES

1. The QACG will hold regular meetings on a quarterly basis. The dates and locations of these meetings will be determined in advance by the QACG. In these meetings, the project QA managers are to submit progress and status reports of QA activities of their projects.

2. Additional meetings may be called by the Chairperson, upon his/her initiative or recommendation of a voting member. The meeting will be scheduled and announced to the QACG members and, as applicable, to outside parties.

3. Other discussion items will be identified by the Chairperson and assigned, as necessary, to the members or resource persons for their presentation. Documents for discussion during the meeting are to be prepared and reviewed in accordance with Procedure OGR 1.0.

4. Decisions on issues/problems taken up in the meeting will be by consensus among the voting members. If consensus on the outcome cannot be achieved, the Chairperson will take appropriate action in accordance with Procedure OGR 1.0.

5. The outcome of each meeting will be summarized by the Chairperson before adjournment. The summary will be prepared in writing for the official record and will be signed by the Chairperson and the QA Managers of the projects. The summary will contain agreements reached, decisions made, issues resolved, as applicable, and will include action items along with assignments for each such action item. The QACG Secretary will include this meeting summary in the minutes of the meeting.

6. Any guidance or direction by the QACG will constitute a proposal, subject to implementation in accordance with OCRWM management procedures, i.e.

   - Technical, schedule, and cost impact, including impacts across the System, will be evaluated and change procedures followed as applicable.

- Direction and guidance within existing scope, budget, and schedule is approved by the Siting, Licensing and Quality Assurance Division Director and issued to the Project Managers.
- Direction and guidance representing changes in scope, budget, or schedule is approved by the OGR Associate Director and issued to the Project Managers.

7. When specific tasks are to be accomplished, the Chairperson may create, on an ad-hoc basis, task forces or working groups for this purpose. The composition of the task force or working group will be determined by the QACG Chairperson, in consultation with the voting members.

PRODUCTS

1. The summary and minutes of each meeting will be maintained as non-permanent records in the files of the OGR QA Manager.

2. Reports of task forces or working groups will be submitted to the QACG Chairperson and maintained as non-permanent records in the files of the OGR QA Manager.

REVISED 11/10/86

DRAFT CHARTER FOR THE QUALITY ASSURANCE WORKING GROUP ON WASTE ACCEPTANCE

I. SCOPE

The Quality Assurance Working Group on Waste Acceptance (QAWG-WA) will convene as necessary to discuss issues pertinent to quality assurance in order to:

A. foster consistency between OGR (Office of Geologic Repositories) and the Waste Producers (West Valley Demonstration Project (WVDP) and Defense Waste Processing Facility (DWPF)) in the development of quality assurance (QA) requirements to be applied to Waste Acceptance Process activities;

B. develop a unified approach or methods for meeting the QA requirements mandated by the NRC or Federal Regulations; and

C. foster consistency in the quality assurance programs developed for Waste Acceptance Process activities.

II. PURPOSE

The QAWG-WA will use OGR and waste producer expertise and experience to:

A. develop a uniform set of Quality Assurance Program requirements to be applied by OGR to the Waste Producers' Waste Acceptance Process activities;

B. identify QA issues from both the Projects' and the Waste Producers' perspective and develop acceptable/appropriate approaches for resolving them;

C. provide a mechanism for information interchange between participants;

D. provide a forum where interface issues can be discussed in a coordinated manner and be resolved by the QAWG-WA; and

E. provide for the use of outside experts to brief the QAWG-WA on common technical issues.

III. ORGANIZATION AND MEMBERSHIP

The QAWG-WA is organized under and is responsible to the U.S. Department of Energy Office of Geologic Repositories (DOE-OGR) Quality Assurance Coordination Group (QACG). The QAWG-WA is responsible for coordinating its activities with Defense Programs (DP) and Nuclear Energy (NE) as shown in Figure 1.

PROCEDURE NO.: OGR 1.0 DATE: 8/8/86

REVISION NO.: 0 PAGE 6 of 6

EXHIBIT 1

LISTING OF EXISTING OGR COORDINATING GROUPS AND THEIR SUBORDINATE WORKING GROUPS

OGR GROUP	CHAIRPERSON	STATUS
1. Site Characterization Coordinating Group	D. Alexander	Oct 10 draft Ready for Comment
2. Geosciences Coordinating Group (AdHoc groups to be established)	A. Jelacic	Reviewed by Projects in final drafting
3. Repository Coordinating Group	M. Frei	Released by S Kale Oct 6
4. Waste Package Coordinating Group	A. Berusch	Released by S. Kale Oct 27
a. Spent Fuel Working Group	N. Abraham	Released by S. Kale Oct 9
5. Performance Assessment Coordinating Group	N. Eisenberg D. Alexander	Open
a. Preclosure Risk Assessment Working Group	T. Eng	Formation appd. Nov 30
6. Licensing Coordinating Group	C. Head	Draft ready for review
7. Quality Assurance Coordinating Group	C. Newton	Both ready for S. Kale approval
a. Quality Assurance Working Group on Waste Acceptance	B. Kehew	
8. Institutional/Socioeconomic Coordinating Group	B. Gale	In drafting.
a. Financial Assistance Committee b. Socioeconomics Committee	Function as integral parts of I/SCG. Charters	
c. Outreach Committee	not planned	
9. Project Management Coordinating Group	R. Blaney	Open
10. Environmental Coordinating Group	J. Parker	To J. Knight Nov 12
a. Environmental Regulatory Compliance Working Group	D. Valentine	Ready for S Kale approval
b. Environmental Planning Working Group	R. Sharma	In drafting.

EXHIBIT 1

LISTING OF EXISTING OGR COORDINATING GROUPS AND THEIR SUBORDINATE WORKING GROUPS

	OGR GROUP	CHAIRPERSON	STATUS
1.	Site Characterization Coordinating Group	D. Alexander	
2.	Geosciences Coordinating Group (AdHoc groups to be established)	A. Jelacic	
3.	Repository Coordinating Group	M. Frei	
4.	Waste Package Coordinating Group	A. Berusch	
	a. Spent Fuel Working Group	N. Abraham	
5.	Performance Assessment Coordinating Group	D. Alexander	
	a. Preclosure Risk Assessment Working Group	T. Eng	
6.	Licensing Coordinating Group	C. Head	
7.	Quality Assurance Coordinating Group	C. Newton	
	a. Quality Assurance Working Group on Waste Acceptance	B. Kellew	
8.	Institutional/Socioeconomic Coordinating Group	B. Gale	
	a. Financial Assistance Committee b. Socioeconomics Committee c. Outreach Committee	Function as integral parts of I/SCG. Charters not planned	
9.	Project Management Coordinating Group	R. Blaney	
10.	Environmental Coordinating Group	J. Parker	
	a. Environmental Regulatory Compliance Working Group	D. Valentine	
	b. Environmental Planning Working Group	R. Sharma	

[illegible]

United States Government **Department of Energy**

memorandum

DATE: FEB 2 6 1987

REPLY TO ATTN OF: RW-223

SUBJECT: Coordinating Group Meetings

TO:
J. Parker, RW-241
C. Newton, RW-24
E. Wilmot, RW-33
A. Jelacic, RW-23
J. Knight, RW-24
N. Eisenberg, RW-232
R. Blaney, RW-222
B. Danker, RW-23
D. Alexander, RW-232
A. Berusch, RW-231

In a January 15, 1987, letter, Steve Kale notified the States and Indian Tribes of DOE's decision to open all OCRWM coordinating groups to State/Tribal participation.

At the February 12, 1987, Spokane Quarterly Meeting among DOE and the States and Indian Tribes, a commitment was made that we would prepare a schedule for all coordinating group meetings for the coming year.

In order to begin preparation of this schedule and to discuss the best procedures for State/Tribal participation, I would like to meet with you on Friday, February 27, 1987, at 2:00 p.m. in Room GH027.

Barry G. Gale, Chief
Economic and Intergovernmental
Analysis Branch
Office of Civilian Radioactive
Waste Management

cc:
S. Kale, RW-20
T. Isaacs, RW-22
J. Bresee, RW-22
R. Stein, RW-23
L. Barrett, RW-33
G. Shaw, Weston
L. Stevenson, Weston

DOE F 1325.8
(12-84)

United States Government **Department of Energy**

memorandum

DATE FEB 2 ' 1987

REPLY TO ATTN OF RW-223

SUBJECT Commitments from Spokane, Washington, Quarterly Meeting

TO
T. Isaacs, RW-22
S. Rousso, RW-10
R. Stein, RW-23
J. Knight, RW-24
L. Barrett, RW-32
R. Gale, RW-40
J. Anttonen, BWIP
J. Neff, SRPO
D. Vieth, NNWSI
A. Benson, RW-223
C. Peabody, RW-223

Attached are the commitments from the February 12, 1987, Spokane, Washington, Quarterly Meeting of States and Indian Tribes, along with the person responsible for each commitment.

Please provide me the status of these commitments as soon as they are available. When the meeting highlights are sent to those who attended the Quarterly Meeting, I would like to include the status of any completed commitments.

If you have any questions, I can be reached on 586-8320 or FTS 896-8320. Thank you for your assistance, not only on these commitments but for your help with the meeting in Spokane. I believe it was a very successful meeting.

Judy
Judy Leahy
Economic and Intergovernmental
  Analysis Branch
Office of Civilian Radioactive
  Waste Management

Attachment

cc: S. Kale, RW-20
B. Gale, RW-223
J. Bresee, RW-223
B. Mussler, GC-11

SPOKANE QUARTERLY MEETING COMMITMENTS

Responsibility	Spokane Commitment
T. Isaacs	1. DOE will inform the States and Indian Tribes of steps to ensure opportunities for meaningful participation of the States and Indian Tribes in the DOE/NAS technical meetings.
C. Peabody	2. DOE will develop a proposal for a one-year calendar of coordinating group meetings and send it to the States and Indian Tribes for comment.
S. Rousso	3. DOE will send a copy of the FY 88 budget request to the States and Indian Tribes.
J. Anttonen	4. BWIP will meet with the State of Washington and the Indian Tribes to discuss the study on the diameter of the exploratory shaft that is reflected in the Mission Plan Amendment.
R. Gale	5. DOE is available to meet with the States and Indian Tribes to discuss the draft Mission Plan Amendment before the April 3 deadline for comments.
J. Knight R. Stein	6. At the DOE/NRC Interagency Coordinating Committee meeting, DOE will discuss with the States and Indian Tribes the LSS and the negotiated rulemaking, pending the S. Kale conversation with procurement officials. (Also, tentatively at the ISCG)
J. Anttonen	7. BWIP will meet during the week of February 17-20 with the State of Washington and the Indian Tribes to address technical scoping and how full-year funding can be awarded in an expeditious manner.
J. Anttonen	8. BWIP will provide to the State of Washington and the Indian Tribes the exact date for closure on their grants as soon as possible after the meeting referenced above.
J. Anttonen J. Neff D. Vieth	9. Each Project Office will continue to work with the States and Indian Tribes to come to agreement on full-year grants.
A. Benson	10. DOE will put on the ISCG agenda a discussion of grant problems and possible approaches to resolve problems.
J. Knight J. Anttonen	11. DOE/HQ and BWIP will contact the State of Washington and the Indian Tribes to discuss and resolve quality assurance issues (SCP). (Also, tentatively at the ISCG)

* Text in parentheses is HQ addition to commitment after the meeting.

R. Stein	12. DOE will provide a description at the ISCG of the format of SCP reference documents and of the locations where the documents will be provided, and DOE will provide all reference documents at the same time the SCPs are released.
D. Vieth	13. NNWSI will provide the State of Nevada with letters regarding participation in the stop work orders, and will provide a briefing at the State's request.
L. Barrett J. Neff	14. DOE will determine whether there are any studies (ongoing or planned) about barge transport to site-specific locations within Texas.
J. Anttonen J. Neff D. Vieth A. Benson	15. DOE/HQ and the Project Offices will: a) continue to work on near-term funding issues, identify any recommendations for changes, and report at the next ISCG meeting; and b) work on the near-term needs for urgent action to release funds. (Progress report at ISCG)
C. Peabody	16. States and Indian Tribes will make recommendations on how DOE should publicize quarterly meetings.
J. Leahy	17. DOE will poll the States and Indian Tribes on the proposal to hold the next quarterly meeting in Las Vegas and on the date for that meeting.

* Text in parentheses is HQ addition to commitment after the meeting.

QUESTIONS FROM SENATOR ADAMS

Question 3: Last year the Congress, in adopting the Continuing Resolution, instructed the Department to make more of an effort to work cooperatively with the States and Indian Tribes. Would you please provide for the record any instruction, policy memoranda or guidelines to Office of Civilian Radioactive Waste Management personnel or offices to implement this directive.

Answer: At the November 20, 1986, meeting held with the States and Indian Tribes to discuss the consultation and cooperation process, it was agreed to work together to better define the C&C process. The Draft Mission Plan Amendment identifies a number of new C&C initiatives and provides direction to DOE staff.

Management and staff at both Headquarters and in the field regularly meet to exchange views, guidance, and direction aimed at enhancing our working relationships with the States and Indian Tribes. Attached are information and guidance provided to staff in connection with recent ISCG and Quarterly meetings with States and Indian Tribes.

QUESTIONS FROM SENATOR ADAMS

QUESTION 4: **Please describe what design changes the emplacement of consolidated spent fuel, as processed by the proposed Monitored Retrievable Storage, must be made in the repository designs for the three candidate sites. Please provide the status of the specific redesign efforts to incorporate those changes.**

ANSWER: At this time, the Office of Geologic Repositories is continuing to develop repository designs on the basis of the Authorized System. No repository redesign efforts for the Monitored Retrievable Storage (MRS) system are currenly being performed. Design studies were conducted and completed in 1985 to assess the impacts of an integral MRS on the repository designs and costs. The design studies indicated that the repository surface facility design in the Authorized System could be simplified if an MRS were part of the disposal system. There is no significant change in the design or operation of the underground support portion of the surface facilities.

QUESTIONS FROM SENATOR ADAMS

QUESTION 5: Please provide the Department's current estimate of the volume of high-level defense waste which is subject to the President's decision to commingle defense and commercial high-level waste in the same repository system pursuant to Sec. 8 of the Nuclear Waste Policy Act by originating facility. Please identify which portion of these wastes the Department now anticipates will be emplaced and on what schedule.

ANSWER: The Department projects that by the year 2020 the Defense High Level Waste (DHLW) inventory will total approximately $379x10^3$ cubic meters. (Reference: "Spent Fuel and Radioactive Waste Inventories, Projections and Characteristics," report number DOE/RW-006, Rev 2 published October 1986). This inventory includes waste at Hanford for which no decision has been made regarding disposal techniques. For planning purposes, the Department is using 16,000 canisters of DHLW (FRN-Vol 51, p43566, Dec. 2, 1986). This is shown in the January 1987 Draft Mission Plan Amendment as 8,000 MTU based on the assumption that each canister contains 0.5 MTU. Additionally 640 metric tons (320 canisters) of high-level waste are projected to be emplaced in the repository system from the West Valley Demonstration Project.

Shown in the attached table is the proposed waste acceptance schedule as it appears in the Draft Mission Plan Amendment (DOE/RW-0128, January 1987).

ANSWER 5: (Cont'd)

This table indicates the Department's current schedule to emplace DHLW. It should be recognized that 8000 MTU has been chosen by the Department as a nominal target level strictly for planning purposes. This estimate contains substantial uncertainty due to such factors as the level of production, potential construction of additional defense waste processing capacity, waste consolidation procedures, and the eventual disposition of defense waste now stored at Hanford, Washington.

Table F-1. Illustrative waste-acceptance schedule
(All quantities in metric tons of uranium)

	MRS facility			First repository		Second repository		Total system acceptance	
Year	Spent fuel received	In storage	Spent fuel shipped	Spent fuel	MLW	Spent fuel	MLW	Spent fuel	MLW and spent fuel
1998	1200	1200						1200	1200
1999	1200	2400						1200	1200
2000	1200	3600						1200	1200
2001	1200	4800						1200	1200
2002	1200	6000						1200	1200
2003	2000	7600	400	400				2000	2000
2004	2650	9850	400	400				2650	2650
2005	2650	12100	400	400				2650	2650
2006	2650	13850	900	900				2650	2650
2007	2650	14700[A]	1800	1800				2650	2650
2008	2650	14700	2650	3000[B]	400			3000	3400
2009	2650	14700	2650	3000	400			3000	3400
2010	2650	14700	2650	3000	400			3000	3400
2011	2650	14700	2650	3000	400			3000	3400
2012	2650	14700	2650	3000	400			3000	3400
2013	2650	14700	2650	3000	400			3000	3400
2014	2650	14700	2650	3000	400			3000	3400
2015	2650	14700	2650	3000	400			3000	3400
2016	2650	14700	2650	3000	400			3000	3400
2017	2650	14700	2650	3000	400			3000	3400
2018	2650	14700	2650	3000	400			3000	3400
2019	2650	14700	2650	3000	240			3000	3240
2020	2650	14700	2650	3000				3000	3000
2021	2650	14700	2650	3000				3000	3000
2022	2650	14700	2650	3000				3000	3000
2023	1410	13460	2650	3000		900		2660	2660
2024		10460	3000	3000		1800		1800	1800
2025		7460	3000	3000		3000	400	3000	3400
2026		4460	3000	3000		3000	400	3000	3400
2027		1460	3000	3000		3000	400	3000	3400
2028		0	1460	1460		3000	400	3000	3400
2029						3000	400	3000	3400
2030						3000	400	3000	3400
2031						3000	400	3000	3400
2032						3000	400	3000	3400
2033						3000	400	3000	3400
2034						3000	400	3000	3400
2035						3000		3000	3000
2036						3000		3000	3000
2037						1940		1940	1940
2038									
Total	59,760		59,760	66,360	4640	40,640	4000	106,000	114,640

[A] Maximum quantity stored at the MRS facility is 14,700 MTU.

[B] In years when the repository acceptance does not match MRS facility shipments, the difference is attributable to shipments from nearby reactors directly to the repository.

QUESTIONS FROM SENATOR ADAMS

QUESTION 6: Please provide the schedule for payments to the Nuclear Waste Fund for the disposal of the defense wastes identified in Question 5 and the rationale for that schedule.

ANSWER: The defense high-level waste (DHLW) disposal fee payment schedule has not yet been established. When established, it will provide for payments that are sufficient to cover the estimated cost of DHLW disposal. The cost of DHLW disposal will be reviewed annually as part of the regular fee adequacy analyses. On December 2, 1986 the Department published a Notice of Inquiry requesting public comment on alternative methods for determining total DHLW disposal fees. The deadline for receipt of public comments was February 2, 1987. Currently, the comments are being reviewed and a final notice of fee determination methodology is expected to be published by mid-year. Subsequently, an agreement will be executed between the Department's Office of Civilian Radioactive Waste Management and Office of Defense Programs that will include an agreement on the amounts to be requested annually in the Department's budget. The actual amounts to be paid annually into the Nuclear Waste Fund will be subject to the regular Congressional appropriations process.

QUESTIONS FROM SENATOR ADAMS

QUESTION 7: Please describe the status of the stop work orders issued in May of 1986 to contractors to the Basalt Waste Isolation Project, the issues and factors that resulted in their issuance, the process for resolving the issues and factors, and the schedule for recommencing investigative activities.

ANSWER: The Stop Work Order was issued only to the principal contractor serving the Basalt Waste Isolation Project in early 1986. DOE audits were performed to determine the status of the contractor's upgrading of technical and management controls and procedures and the readiness for the transition to the site characterization phase in the event that the basalt site was selected for characterization. DOE concluded that the technical and management controls and procedures had not attained the levels satisfying Nuclear Regulatory Commission requirements for establishing a licensing basis, Nuclear Waste Policy Act requirements, and DOE requirements for a major project acquisition. Consequently, the Stop Work Order was issued to stop a substantial part, but not all, of the work in progress at this site. A detailed process was established for preparing, reviewing, and approving controls and procedures and for training all project personnel in their implementation and enforcement.

ANSWER 7: (Cont'd)

Work is being restarted on an activity-by-activity basis when DOE becomes convinced that all applicable quality assurance requirements are satisfied for each activity. Completion of this process is targeted for mid-1987.

QUESTIONS FROM SENATOR ADAMS

QUESTION 8: Please describe the timetable for transfer of contractor responsibility between Rockwell Hanford and Westinghouse as it relates to both prime contractor and Office of Civilian Radioactive Waste Management responsibilities. Please provide a description of personnel changes applicable to these two responsibilities to the extent now known.

ANSWER: The transfer of responsibility from Rockwell Hanford to Westinghouse originally was scheduled to occur on October 1, 1987. This schedule has been accelerated with transfer of contractual responsibility got Office of Civilian Radioactive Waste Management supported work being targeted for the end of July 1987. The relative responsibilities of the contractor and of the DOE project office, who manages the contracted effort at Hanford, will be unchanged by the transfer. Most of the Rockwell staff will transfer to Westinghouse with no loss of continuity and momentum in the technical activity. Changes will occur at the management level as the Westinghouse management team is being installed, and, although vital to program success, involves only a relatively small group of people.

QUESTIONS FROM SENATOR ADAMS

QUESTION 9: During the hearing on February 6, 1987, you and Senator Adams discussed potential problems with nuclear waste transport casks and the Department's testing program. Please provide a description and inventory of the tests that have been conducted to date by the Department or its contractors of nuclear waste and spent fuel shipping casks and the results of those tests.

ANSWER: The Department of Energy and its predecessor agencies (the Atomic Energy Commission and the Energy Research and Development Administration) have conducted many tests in support of cask development and licensing. A few (by no means all inclusive) of the more recent nuclear waste and spent fuel shipping cask tests are listed:

Cask	Scale	Test Description & Results
DHLW	1/2	Defense High Level Waste (DHLW) cask. SNL conducted drop and puncture tests as follows: Test 1. 30-ft (9-m) Bottom End Drop. Test 2. 30-ft (9-m) Closure End Drop (-20oC) Test 3. Gas Sample Port Puncture (10oC) Test 4. 30-ft (9-m) Side Drop #1 (10oC) Test 5. Closure End Center Puncture. Test 6. 30-ft (9-m) Center-of-Gravity Over Bottom Corner Drop. Test 7. 30-ft (9-m) Side Drop #2 (10oC) Test 8. Penetration Cylinder Drop. Note: Angle measured from horizontal.

Cask	Scale	Test Description and Results
		X-radiography examination of the shield liner after Tests 1, 3, 5, and 7 showed no changes (no cracks) in the depleted uranium. Although a scaling relationship for leakage testing has not been developed, qualitative information can be gained from scale-model leakage testing. The helium leakage rate after each test was <1 x 10-10 cm. (1986)
TMI-125B	1/4	The TMI-125B cask is a lead shielded shipping cask designed to carry damaged TMI fuel assemblies to INEL. SNL conducted 30-ft (9-m) bottom, 30-ft (9-m) oblique (62.5o), and 30-ft (9-m) side drop tests, side punch and closure punch. The cask passed all tests successfully. Although a scaling relationship for leakage testing has not been developed, qualitative information was gained from scale-model leakage testing. The leakage rates for the cask closure were acceptable. (1985)
TRUPACT I	Full and 1/4 Scale	SNL conducted normal and hypothetical accident tests on a 50,000 lb contact-handled transuranic waste transport packing. The tests included:

Cask	Scale	Test Description and Results
		Test 1. 12" Bottom Drop, Normal Conditions. Test 2. 30-ft (9-m) Center-of-Gravity Over Corner. Test 3. 30-ft (9-m) Edge Drop. Test 4. Bottom Puncture Test. Test 5. Center-of-Gravity Over Corner Puncture Test. Test 6. Oblique Angle Puncture Test (Filters). Test 7. 30 minute (actual 45 minute) Jet Fuel (JP-4) Pool Fire Test. Structural and thermal performance was demonstrated throughout the test series. Containment was provided in all tests. Prior to full scale testing, scale model drop and puncture tests of the packaging were performed. Engineering development tests (full scale, scale model, and subsystem) and a large number of materials and components tests were conducted at high, ambient, and low temperatures to ensure design performance. Contents response testing was performed to provide data on cargo during drop and puncture tests.
Modified HNPF	Full	Four 30-minute 1200°C torch tests on a modified Hallum Nuclear Power Facility (HNPF) cask were conducted by SNL on a program funded by the DOT. The DOE made available a retired spent fuel cask for testing.

Cask	Scale	Test Description and Results
		Because the cask was of an older design, it did not have a neutron shield or impact limiters. The cask was modified to include these features to be more representative of current designs. The tests included Test 1. Side of Cask, Neutron Shield Intact. Test 2. Side of Cask Near Closure (Seal) End, Neutron Shield Intact Test 3. Opposite Side of Cask, Neutron Shield Voided. Test 4. Head-On Impact Limiter, Neutron Shield Voided. The greatest temperature difference measured on the inside cavity of the cask as a result of torch fire testing was 80oC for Test 3.
22 Ton Spent Fuel Cask	Full and 1/8 Scale	SNL conducted 60 and 84 mph head-on impact tests of a truck mounted spent fuel cask into a massive concrete barrier. Prior to the full scale impact tests, scale model tests were performed. The purpose of full scale testing program was to validate analytical and physical modeling techniques used to predict the accident response of spent-nuclear-fuel cask transport systems. Good correlation was obtained with the pretest analytical and scale modeling predictions. (1977)

Cask	Scale	Test Description and Results
75 Ton Cask in a Special Railcar	Full and 1/8 Scale	SNL impacted a special railcar at 80 mph into a massive concrete barrier. Prior to the full scale impact test, scale model tests were conducted. The purpose of full scale testing program was to validate analytical and physical modeling techniques used to predict the accident response of spent-nuclear-fuel cask transport systems. Good correlation was obtained with the pretest analytical and scale modeling predictions. (1977)
75 Ton Cask	Full	SNL conducted a fire test in a special 80 mph crash-tested railcar and cask. The lead-shielded cask survived 90 minutes of fire. (1978)
B of E 83	Full	This obsolete lead-shielded cask was drop tested by SNL from a helicopter 2000 ft onto undisturbed hard prairie soil and 30-ft (9-m) drop tested onto an unyielding target at ORNL. In the helicopter drop, the cask, a simple cylindrical cask weighing 6,720 lb. used for handling irradiated test capsules, penetrated 8 ft into the hard prairie soil after impacting at 246 mph. The cask suffered no measuring deformation. The 30-ft (9-m) drop test onto an unyielding surface produced significantly more deformation and lead slumping due to the high deceleration forces incurred at impact. Weld failures occurred in the outer shell of the cask as a result of the 30-ft (9-m) drop. This cask would have safely held its contents without release. (1975)

Cask	Scale	Test Description and Results
OD-1	Full	This obsolete lead shielded cask was drop tested by SNL 2000 ft from a helicopter onto undisturbed hard prairie soil. The cask, a simple cylindrical unit mounted on a rectangular base plate weighing 16,300 lb had previously been used to ship and store fuel from an Oak Ridge research reactor. It penetrated 4.2 ft after impacting at 230 mph. The cask experienced superficial deformation that would not have resulted in release of contents. The lead shielding slumped about 0.8" as the result of impact. A corresponding 30-ft (9-m) test was not performed. (1975)
HWCTR	Full	ORNL conducted 30-ft (9-m) oblique and center of gravity over corner tests on the Heavy-Waste Component Test Reactor (HWCTR) cask. The purpose of program was to establish the adequacy of calculational techniques that were than employed (1970's) to predict cask damage. The cask held air pressure following the two drop tests, indicating no significant leaks in cavity.

Prior to 1977, the AEC and ERDA had performed a number of cask tests to establish the adequacy of calculation techniques used to predict cask response. Tests included drop tests of obsolete casks at ORNL, drop testing of scale model casks to establish the validity of scaling relationships, and to assist licensing.

Other types of cask testing, both past and present, include radiation shielding, thermal, criticality, operational, and materials and components testing.

APPENDIX IV

Additional Material Submitted for the Record

Testimony Of

THE HONORABLE NEIL GOLDSCHMIDT

Governor of Oregon

Before The

U.S. Senate Committee

On Energy and Natural Resources

Washington, D. C.

February 4, 1987

Chairman Senator Johnston, members of the Committee. I have asked Oregon's Senior Senator, Mark Hatfield, to introduce my testimony today. I very much appreciate Senator Hatfield's help in bringing my views to the Committee's attention. His service to the people of Oregon is, as always, of the highest caliber.

Senators, the people of Oregon and their Governor fully support your intent that this nation have a permanent repository for nuclear waste. The Nuclear Waste Policy Act approved by Congress five years ago clearly spells out how that is to be achieved.

But, the process you so clearly defined in the Act has been abused. The credibility of the U.S. Department of Energy is in tatters because of that abuse. More years have been wasted. And, only Pollyanna now could doubt that the process to site a nuclear waste repository is headed for failure again.

We must restore honor to that process. We must not fail this time. But, failure is certain if Congress does not take action soon.

The people of Oregon and their Governor flatly oppose a permanent repository for the nation's nuclear waste at Hanford, Washington.

The reason is simple. Hanford geologically is unfit. That conclusion was reached by US DOE'S own contractors. Hanford is not and never was a superior site for a nuclear waste repository.

Only a flawed and discredited process kept Hanford in the running. And, on May 28, 1986, the President of the United States announced that Hanford would be one of three finalist sites. The President also said that the search for a second site would be postponed.

The President acted on the advice of the Secretary of Energy. Our nation deserves sounder advice and better service. We are compelled to turn to this committee and the Congress for equity and sanity in the search for a nuclear waste repository.

In November 1986, the voters of Washington State -- by an 83 to 17 margin -- endorsed a landmark referendum on the Hanford question.

On February 2, I asked the Oregon Legislature to refer to the voters of Oregon an almost identical question. I expect an almost identical response from Oregonians in May of this year.

Governor Booth Gardner has proposed a strategy by which all parties--at the state, regional, and national levels--can resolve repository siting conflicts. I have told Governor Gardner that I will work with him on that front--and to build a solid, unified regional coalition to oppose the Hanford site. We must and we will speak with one voice.

That message will say:

- Stop the site selection process now. Stop the three specific site studies now. Resume the site search only when US DOE understands that it is not above the law. US DOE must be made to conform to the Nuclear Waste Policy Act.
- Order the Secretary of Energy to reverse his illegal decision to suspend the search for a nuclear waste repository in the Eastern United States. The Secretary clearly has thumbed his nose at Congressional intent in the Nuclear Waste Policy Act.
- Insist that a resumed site search include all acceptable geology -- including granite. Demand that the site for the first repository be chosen because it scientifically and technically is the superior site. The choice must not be made simply because that state and region can politically be outmuscled.

The people of Oregon and Washington will demand that Congress heed its own clear intent in the Nuclear Waste Act with regard to US DOE's budget -- and how US DOE spends that money.

> For illustration, I remind you that US DOE today stands ready to waste away a billion dollars for more studies at Hanford. And Hanford, by US DOE's own admission, is the least safe site and the most costly site. Hanford also was ranked highest for expected releases to the environment among the five sites under consideration a year ago.

Only US DOE could construe those conclusions as a rationale to spend a billion dollars.

Oregon's message will differ from Washington's in only one way. We will insist that Oregon have the same status in site selection as a state in which a repository is proposed.

We will ask Congress to change the law that denies us that status. We are unique among the states adjacent to potential host states because:

- The Columbia River is Oregon's lifeblood. The river has been contaminated in the past by discharges from eight old nuclear reactors. Today, groundwater is threatened by contamination from open trenches and leaking tanks of radioactive wastes at Hanford.

- The Columbia collects groundwater from the nuclear reservation. The river then flows westward for 300 miles past and through communities that comprise more than half of Oregon's population.

- Leaks from a repository at Hanford could reach local groundwater and the Columbia. Oregon simply will not accept the threat that Hanford will again poison the Columbia River with radioactive contamination.

- Oregon must have a larger role because of the added risks imposed on us by the transport of high-level radioactive wastes. Hanford is in the southeastern corner of Washington. Because it is so close to the Oregon border, wastes shipped to or from Hanford will travel farther on Oregon highways than on Washington's.

  Oregon needs a larger role in the siting process even when Hanford is dropped from US DOE's list. There is 40 years accumulation of radioactive defense wastes at Hanford. Oregon has concluded that the wastes must be cleaned up to protect groundwater and the river. When the wastes are removed from Hanford, Oregon faces the added risks of having 7,000 truckloads of radioactive waste on our highways.

  The risks to our people and our environment are an issue in which we must have legal equal standing and a strong voice.

Senators, Oregon does not oppose a nuclear waste repository. We have a nuclear power plant. We generate nuclear waste. In a dozen years, Oregon has contributed about 1 percent of the nuclear waste this nation must store safely -- in effect, forever.

My message here today is different from the strident hypocrisy of "not in my backyard". If Hanford could scientifically be proven to be technically superior to other candidate sites, Oregon would not be taking US DOE to court.

If Hanford were geologically fit to keep nuclear wastes away from people and the environment so long as the wastes are dangerous, we likely would not need this hearing, If US DOE had not prostituted its own process to nominate and select candidate sites, we would be miles further down the road toward our goal -- instead of bogged down here.

This nation made what we now know is an irretrievable commitment to nuclear power more than 40 years ago. Promises were made then that must be kept hundreds and thousands of years from now -- even if we do not ever produce any more nuclear waste.

There was not then -- and there does not now appear to be a parallel commitment to pay the real costs...the astronomical and eternal costs of "electricity too cheap to meter". But, pay we must -- one way or another.

There were a lot of promises made -- and broken. Sure, nuclear waste is dangerous stuff. Of course, we'll take care of it. Someday. Just a week ago, we learned that even the latest target year -- 1998 -- has slipped by five years.

Someday just isn't good enough.

The accidents at Three Mile Island and Chernobyl are, thank God, behind us. But, there is clear and disturbing evidence that pre-Three Mile Island and pre-Chernobyl mindsets persist today. Those mindsets are afraid or unwilling to look at technical and scientific judgments and ask: "What if we are wrong?"

There are grave consequences about building a deep repository at Hanford -- and being wrong. The site is immersed in groundwater. The river is close by. The impacts of a leak in the repository could be severe for Oregon -- even if the leak could be detected in time.

Some engineers argue that even if Hanford's geology can't be trusted, monitor systems could always detect a repository leak in time to fix it.

But, what if they are wrong?

Remember Hanford's defense wastes. Because of 40 years of radioactive waste production, storage, and leaks, a good part of the reservation has been exposed to radioactivity.

Could leaking radioactivity in the repository be distinguished from other radioactive contamination on the reservation? That uncertainty alone should disqualify the Hanford site.

Chairman Johnston, Senators . . . let me sum my testimony quickly.

- Oregon opposes a repository at Hanford because the site geology is unfit to safely store nuclear wastes. If that were not the case, we would not oppose the repository at Hanford.

- We believe that you -- the Congress -- must send a strong, clear message to the Secretary of Energy. Stop this flim-flam of a site selection process now. Set it straight. Restore the search for an Eastern repository. The White House and US DOE must be made to realize that Congress adopted the Nuclear Waste Policy Act with clear directives to federal agencies.

In the meantime, we in Oregon and the Pacific Northwest will practice a new vigilance: in the courts as we challenge US DOE's high-handed tactics; in the voting booth as we collectively demand that our interests and concerns be addressed . . . and here in the Congress, Oregon's delegation is experienced, highly informed, and totally aware of what is at stake. We look to them and to you for fair play and common sense.

Thank you.

3659M(d4)
01/29/87

EDISON ELECTRIC INSTITUTE

AMERICAN NUCLEAR ENERGY COUNCIL

UTILITY NUCLEAR WASTE MANAGEMENT GROUP

ELECTRIC UTILITY COMPANIES' NUCLEAR TRANSPORTATION GROUP

ATOMIC INDUSTRIAL FORUM

STATEMENT ON

U.S. DEPARTMENT OF ENERGY'S IMPLEMENTATION OF THE NUCLEAR WASTE POLICY ACT OF 1982

SUBMITTED TO

COMMITTEE ON ENERGY AND NATURAL RESOURCES

UNITED STATES SENATE

FOR THE HEARING RECORD OF

JANUARY 29, FEBRUARY 4 AND 5, 1987

The Edison Electric Institute, American Nuclear Energy Council, Utility Nuclear Waste Management Group, Electric Utility Companies' Nuclear Transportation Group, and the Atomic Industrial Forum are pleased to have the opportunity to provide their collective views on DOE's implementation of the Nuclear Waste Policy Act of 1982 (NWPA). These groups represent (in some instances, among others) the electric utilities with nuclear energy programs who are the sole financial supporters of the DOE activities under the NWPA. The electric companies are responsible to the electricity consumer for the appropriate use of these funds. In addition to paying into the Nuclear Waste Fund, as required by the NWPA, electric utilities are, through participation in these groups, following the NWPA implementation, as well as providing assistance to the Federal Government, where appropriate.

The Edison Electric Institute (EEI) is the association of investor-owned electric companies. Its members serve approximately 73 percent of ultimate electric customers in the nation. EEI's membership includes the majority of DOE's nuclear waste services customers.

The American Nuclear Energy Council (ANEC) represents over 100 organizations having an interest in nuclear power, including investor, public and cooperatively-owned utilities, manufacturers, architect-engineers and various firms in the nuclear fuel cycle.

The Utility Nuclear Waste Management Group (UNWMG) is a specific activity that is funded by 43 utilities with nuclear programs, including EEI member companies, public utilities and cooperatively-owned utilities. Its primary purpose is to promote the implementation of the Nuclear Waste Policy Act and to assist in the resolution of spent fuel storage and nuclear waste disposal issues.

The Electric Utility Companies' Nuclear Transportation Group (EUCNTG) represents 33 investor owned and publicly owned utilities. One of EUCNTG's primary objectives is to promote successful implementation of transportation-related provisions of the NWPA.

The Atomic Industrial Forum (AIF) is an association dedicated to the development of the peaceful uses of atomic energy. Its approximately 400 U. S. members include electric utilities, which are funding activities mandated under the NWPA, as well as manufacturers, architect-engineers, constructors and consultants playing important roles in its implementation.

The Nation requires development of a technically sound and publicly acceptable high-level radioactive waste disposal program in order that both commercial and defense use of nuclear energy continue. In this regard, it is the industry's overriding goal to achieve efficient, effective and fair implementation of the NWPA leading to the successful operation of a national high-level radioactive waste disposal system as close to the NWPA schedule as possible. For DOE to take the necessary steps to implement the NWPA during FY 1988, the industry asks Congress:

- to appropriate for FY 1988, from the electric utility/ customer-funded Nuclear Waste Fund, sufficient funds for DOE to proceed expeditiously with site characterization at the three potential first repository sites, including the initiation of drilling exploratory shafts,
- to authorize and fund the construction of the Monitored Retrievable Storage Facility (MRS), and
- to provide equitable payments of defense waste disposal fees into the Nuclear Waste Fund.

The industry is extremely concerned over the current state of affairs surrounding the NWPA implementation. After electric utilities with nuclear energy programs have collected from electricity consumers and paid $ 2.7 billion into the Nuclear Waste Fund, DOE is facing unprecedented opposition to the continuation of NWPA implementation. DOE is attempting to pursue the NWPA under the cloud of a crisis in confidence in its ability to manage the program. Some of DOE's difficulties are of its own making, but many have been manufactured by those who would seek to halt the NWPA implementation.

On January 28, 1987, DOE published a Draft Mission Plan Amendment (DMPA) that lays out a new program strategy, which we currently have under review for comment to DOE. Unfortunately, one aspect, the second repository reprogramming, has led to an impasse over DOE moving forward. The DMPA should be revised, prior to final submission, in a manner acceptable to Congress to provide direction for the high-level radioactive waste program so it can move forward for the benefit of the Nation. The industry stands ready to aid in this process.

NUCLEAR WASTE POLICY ACT OF 1982

Congress passed the Nuclear Waste Policy Act of 1982 in December 1982 and President Reagan signed the NWPA into law on January 7, 1983. This action culminated many years of Congressional effort, involving many parties (utilities, environmental groups, States, Indian Tribes and the Federal Government) that sought enactment of a statute to create a credible national high-level radioactive waste disposal program. Years of good faith efforts by all concerned produced comprehensive and carefully balanced legislation. While no one party was pleased with all aspects of the NWPA, all parties accepted the final compromise. When implemented, the NWPA would assure the long-term safe handling, transportation and disposal of spent fuel and defense high-level nuclear waste.

In essence, the NWPA sets out a process for the development and operation of a high-level radioactive waste disposal system. The Secretary of Energy is authorized to identify, construct and operate one repository and the related transportation system, select a site for a second repository and provide Congress a proposal for a Monitored, Retrievable Storage facility (MRS). Congress, in the NWPA, reserved for itself the decisions of whether to authorize construction of a second repository or an MRS. Through the DMPA, DOE is recommending schedule changes for activities required by the NWPA that could make the schedules more realistic and the total program more manageable. It is appropriate that DOE bring these recommendations to Congress, and that they be considered dispassionately on their merits. One of the challenges to the present program is the perception by some that a delay in implementing the NWPA is acceptable and even desirable if it results in a better repository system. The program may continue to be paralyzed by the quest for a better solution, even though the direction being pursued is entirely adequate for the safe disposal of nuclear waste.

Obligations Under the NWPA

Electric utility companies with nuclear energy programs are fulfilling their commitments under the NWPA. As stated above, electric utilities, on behalf of the electricity consumers, have paid about $ 2.7 billion into the Nuclear Waste Fund and continue to pay at a rate of over $ 400 million per year; the Fund's current balance is about $ 1.7 billion. Although these monies are available only for expenditures pursuant to the NWPA and must be appropriated annually by Congress, the Administration uses the positive balance in the fund, each year, to reduce the overall federal deficit calculation under Gramm-Rudman-Hollings. On the other hand, the Administration has not paid any of its fair share as required by the NWPA into the Nuclear Waste Fund for disposal of defense high-level radioactive waste.

The NWPA represents a bargain between Congress and the electric utilities. This bargain was reflected in contracts signed by DOE and electric utilities that require the utilities to pay into the Nuclear Waste Fund well in advance of receiving services and DOE is required to begin receiving spent fuel in 1998. The current impasse over the second repository reprogramming is giving the industry pause to consider whether or not DOE will be allowed by opponents to NWPA implementation to live up to its obligation and what recourse might be available to utilities in the event that it is not.

In the interim period, which is beginning to look longer than understood when the NWPA was enacted, the utility industry will be faced with providing spent fuel storage at reactor sites for a longer period than originally anticipated.. A number of utilities have developed, or are developing, on-site storage alternatives against the day that the spent fuel storage capacity originally built into the reactor plants proves to be insufficient. For example, Virginia Power has completed, licensed and is demonstrating a dry cask storage installation at its Surry Station; Carolina Power and Light Company has a licensed dry storage concept using air cooled vaults. Others continue to expand pool storage capacity by installing higher capacity storage racks and a few are involved in developing rod consolidation technology. Electric utilities recognize that they are responsible for on-site storage of spent fuel until DOE takes responsibility in 1998. However, if any utility's spent fuel is not taken from the reactor site by DOE under the original NWPA schedule, it will have to expend additional sums to continue on-site storage. Those utilities could very well seek recovery of those expenditures from the Federal Government due to its failure, for whatever reason, to live up to its contractual obligation.

The NWPA also requires that, once the President determines that a separate defense waste repository is not necessary, the Federal Government contribute its fair share to the Nuclear Waste Fund. Such a decision was made by the President in 1985. Since the Federal Government has not paid any of its share into the Nuclear Waste Fund, there is absolutely no question that commercial electricity consumers have, and are continuing, to subsidize the defense program. This is not just an irritant to the electric utilities and electricity consumers, it is plainly unjust. If the generators of commercial nuclear waste are required to fund in advance the development of the high-level radioactive waste disposal system, so does the generator of the defense waste. DOE has finally made public its proposed methodology for developing a defense waste cost share. Unfortunately, DOE is using an inadequate administrative process to propose an inadequate cost sharing formula that will lead to an inadequate contribution to the Nuclear Waste Fund at some indeterminant time. We ask that Congress require an adequate and equitable cost share for the disposal of defense waste.

Progress to date

Even though the only statutory schedule date that DOE has met was the execution of the contracts with electric utilities (thereby ensuring the unimpeded flow of funds), a number of very important milestones have been reached. Most importantly, the sites for characterization as the first repository were named. It is unfortunate that the impasse over the recommended second repository reprogramming is threatening the progress achieved to this point.

On May 27, 1986, DOE published five massive Environmental Assessments for the nomination of the first repository sites for characterization and recommended three to the President. On May 28, the President approved the first repository site recommendations for characterization of three sites. Approval of the three sites by the President was a major accomplishment.

Throughout the arguments over, and court reviews of, the adequacy of the Environmental Assessments and the process for naming the three potential sites for characterization as the first repository, it is important to keep in mind the purpose of the Environmental Assessments. These documents were not intended to make the dispositive case for the location of the first repository. The Environmental Assessments were intended only to provide an understanding sufficient to indicate that it is worth the substantial investment to carry out the very expensive site characterization. It is only during site characterization that the needed data will be gathered to make the case for a specific site. This will lead to the Environmental Impact Statement, the Presidential recommendation of the first repository site to Congress and the subsequent licensing proceeding, where the dispositive case will have to be made that the selected site meets all the regulatory requirements.

Although the designation of the three sites for characterization missed the NWPA deadline by fifteen months, the decision, nonetheless, was finally made. The presidential approval of the three sites for characterization was based on a careful process that took place over a number of years and the decision-aiding methodology was reviewed and endorsed by the National Academy of Sciences. It is not in the best interests of the Nation to revisit the first repository site designation for site characterization.

As indicated above, electric utilities must plan for providing sufficient on-site spent fuel storage capacity. In doing so, they must take into account the DOE schedule for operation of the high-level radioactive waste disposal system. The current phase of the DOE program is site characterization. While a great deal of information required for site characterization will be secured through surface, sub-surface and laboratory testing, some of the needed information can only be secured by gaining access to geologic data via an exploratory shaft. Utilities recognize that the DOE schedule, even with the five year slip, is "success-oriented" and does not incorporate some of the uncertainties inherent in a program of this type. To minimize the potential for these uncertainties to cause further slippages in the start-up of the first repository, appropriations for FY 1988 and subsequent years from the Nuclear Waste Fund must be sufficient to permit expeditious drilling of the exploratory shafts at the three potential first repository sites.

DOE's progress has been made through the efforts of its own staff and its contractors. A new contracting proposal by DOE for a centralized system engineering contractor will aid in progressing with reasonable schedules and milestones. The industry, in past testimony, urged that DOE move to a more centralized management system and we are pleased to see that DOE is moving forward with this change.

FIRST REPOSITORY SCHEDULE CHANGE AND THE MONITORED RETRIEVABLE STORAGE FACILITY (MRS)

Although the first repository schedule slippage is disappointing, UNWMG reviews of DOE repository projects suggest that a schedule slippage was inevitable; no one predicted the extent of the effort required by the NWPA nor the nature of the concerns of the potential host states.

The MRS has been a misunderstood element of the NWPA program. As an integral part of the high-level radioactive waste disposal system as described in the DMPA, the MRS will perform functions essential to the disposal of spent fuel. It will provide vitally needed flexibility in the planning, design, construction and operation of the disposal system, thereby lessening the effects of uncertainties. Furthermore, the NWPA implementation experience thus far has demonstrated that progress is, indeed, a precious commodity. The MRS is an important item that will make progress towards the operation of the disposal system at a date earlier than would be the case with a repository-only system. Having the MRS in the disposal system would help meet the first repository start-up date by allowing a more flexible and efficient repository design and licensing process.

Now DOE proposes to slip the first repository operations date by five years to 2003 and meet the 1998 contractual obligation to the electric utilities by use of the MRS. The nuclear industry supports the development of an MRS as an integral part of the repository program. However, the MRS is not acceptable for long-term disposal, which must be accomplished in a deep underground repository. If Congress accepts an NWPA implementation change that includes using the MRS as the means to live up to the 1998 obligation, then Congress must authorize the MRS and not restrict its use. Even though the NWPA requires DOE to submit a proposal for the MRS, one is not required for Congress to authorize the facility.

SECOND REPOSITORY

On May 28, 1986, Secretary of Energy John Herrington announced that he concluded that a second repository would not be needed on the schedule contained in the NWPA and that substantial savings could be achieved if Congress permits the site-specific work for the second repository to be put off until the mid-1990s. The industry supports, above all else, the NWPA and recognizes that Congress called for a second repository siting effort. In the DMPA, DOE is recommending that the second repository reprogramming announced this past May be approved by Congress. It is troubling that this one recommendation is the focal point for challenging the credibility of the overall high-level radioactive waste disposal system development. The industry appeals to Congress and DOE to find an acceptable compromise on the second repository program between the two extremes proposed by DOE: the DMPA recommendation or a return to the pre-May 28, 1986 program. Such a compromise should lead to a real commitment for a site selection of a second repository, as required by the NWPA, but on a realistic schedule. The Administration and Congress must work cooperatively to resolve this difficult problem, because it is apparently impeding the ability of Congress to fund the basic program so it can move forward.

CONSULTATION AND COOPERATION

DOE and the affected States and Indian Tribes must make best efforts to reach Consultation and Cooperation (C&C) agreements in a timely manner. However, all parties must recognize that the goals of DOE and the States and Indian Tribes may simply be different and comprehensive agreements may not be possible. As long as good faith efforts are made, the lack of C&C agreements should not prevent DOE from receiving unrestricted appropriations from the Nuclear Waste Fund so that the NWPA implementation program can go forward.

Beyond the outcome of the formal C&C process, DOE must approach realistically the participation of the States and Indian

Tribes in the implementation of the NWPA. The lessons learned during the last four years in selecting the sites for characterization for the first repository and from the MRS experience should be applied, to the extent practical, to the overall repository process.

WASTE PROGRAM INCENTIVES

Congress and the Administration should provide economic incentives to the States and Indian Tribes that will host high-level radioactive waste disposal system facilities. In the NWPA, Congress authorized fairly limited incentive mechanisms. In light of recent history, it is proper for Congress and the Administration to develop a broader scope of incentives needed to compensate the States, Indian Tribes and communities for hosting these facilities. Furthermore, only in Congress can the potential host States directly negotiate with the other States over acceptance of nuclear waste facilities.

CONCLUSION

The Nation's demand for electricity continues to grow. Nuclear energy will supply twenty percent of the Nation's energy needs by the year 1990. The NWPA was a product of Congress's determination that disposal of high-level radioactive waste is essential in order to preserve this nation's energy options. It is imperative that concerns regarding NWPA implementation be addressed and resolved for the national need of high-level radioactive waste disposal to be satisfied and reasonable progress achieved to allow nuclear energy to be a viable source of electricity for the Nation now and in the future. Congress should take positive action to assure that a national high-level radioactive waste disposal system becomes a reality.

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